Journal of the

AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. VI, NO. 12 DECEMBER, 1945 CONSECUTIVE NO. 23

Practical Pharmacy Edition

Editor
GLENN SONNEDECKER

Committee on Publications
GEORGE D. BEAL, Chairman
B. V. CHRISTENSEN
ROY B. COOK
ROBERT P. FISCHELIS
HUGO H. SCHAEFER

Editorial Advisory Board
CHARLES H. EVANS
LEO F. GODLEY
IVOR GRIFFITH
JAMES S. HILL
HARLES F. LANWERMEYER
GEORGE A. MOULTON
JENNINGS MURPHY

TABLE OF CONTENTS

Editorial 352
Letters 353
Straight From Headquarters 354
Conference on Barbiturates 356
Thiouracil 359
Hydrophilic Ointment U.S.P. XIII 365
Camphor Basil 367
U. S. Pharmacists Meet on Samar 369
A. PH. A.-N. A. R. D. Annual Conference 370
A. PH. A.-N. A. R. D. Joint Resolutions 372
Service Selling in Pharmacy 375
Prescription Information Service 379
With A. PH A. Branches 383
Electron Microscopy 384
The Hospital Pharmacist: Editorial 389
Typical Days 390
Annual Index 395

Copyright, 1945, American Pharmaceutical Association

ACTION ON BARBITURATES

THE conference on barbiturates called by the AMERICAN PHARMACEUTICAL ASSOCIATION at its headquarters did more than inaugurate concrete action to control their misuse. It demonstrated again that pharmacy can shoulder its share of responsibilities in solving public health problems. It set a pattern for mutual cooperation among the health professions and state and Federal agencies in such matters, which in the past have been too often marked by pulling and hauling in a half dozen directions by isolated but vitally interested groups.

The conference itself clearly crystallized the opinions and experience of the professions and law enforcement officials for the guidance of A. PH. A.'s Committee on Legislation. To plug up the holes in our distribution system, through which barbiturates now flow to illicit or misguided users, the next step will probably be the formulation of a uniform state law.

To restrict barbiturates to legitimate medical uses, there is general agreement that any legislation must reach beyond the pariahs of pharmacy who may dispense these dangerous drugs over the counter. It must also control the dispensing physician, restrict prescription refills, put a checkrein on any irresponsible manufacturers and wholesale druggists, and make illicit possession of the drug a criminal offense.

If we are to avoid extension of Federal regulation or counterparts of narcotic acts, pharmacists must wholeheartedly back the profession's own program now being formulated. To avoid the tendency toward high-minded but weak-kneed state legislation there must also be a resounding educational campaign.

There must be education of legislators on the need for adequate enforcement funds and procedures; education of pharmacists on the dangerous potentialities of barbiturates and the need for conscientious compliance with reasonable regulation; education of physicians on the need for conservative barbiturate prescribing; and, lastly, education of laymen on the risks of using "sleeping pills" without direct medical supervision.

In each step of this educational program every pharmacist can play an important part. By backing the convincing leadership displayed by A. PH. A.'s Committee on Legislation we can yet turn shadows of the current barbiturate stigma into a shining example of the pharmacist's dedication to public health.

INVENTORY YOUR GOODWILL ASSETS

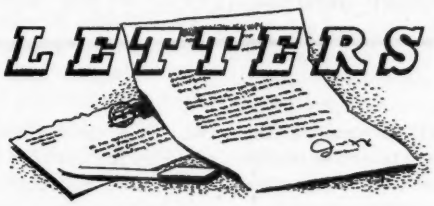
THE year's end provides a good time to take stock of clientele good will as well as to inventory material assets. During the war, when pharmacists strove so conscientiously to maintain service standards and fill the public's health needs, it has been at times disheartening to see nonprofessional employees bring to the pharmacy a liability of substandard service.

As we head into our first postwar year, such indifferent or incompetent personnel of wartime vintage must become ready to admit that the customer is at least sometimes right. Those who are unable or unwilling to measure up to the pharmacist's standards of courteous, friendly and dignified service must be replaced as other personnel becomes available. We should not face any longer a situation where nonprofessional clerks condescend to give a prospective employer an interview.

Whether we like it or not the public understanding of and reaction to the pharmacy as a professional institution do not depend alone on the pharmacist and his prescription department. The valuation you can place on public good will also stems from the service atmosphere of the pharmacy as a whole.

In the independent pharmacy, unwavering standards of personal, skillful service can build a bulwark against encroachments by the big merchandisers and nonpharmaceutical outlets. Where this competitive threat has not appeared in smaller communities, it is no less important, both economically and professionally, to uphold the pharmacist's tradition of neighborly unselfish dedication to the public's needs.

A Very Merry Christmas
and a
Happy Prosperous
New Year



INTERNATIONAL PHARMACEUTICAL FEDERATION

Sirs:

Since September, 1939, when the Nazis attacked Poland the Secretary received only a few letters. Correspondence was continued with some friends in Great Britain and Belgium, but all activity of the Federation was suspended as the members of the Federation were divided into two camps.

After the surrender of the Dutch army and during the occupation of Holland we did fear that the Nazis would seize the possessions of the Federation . . . . Fortunately the Secretary left the old University of Leyden and the goods of the Federation were decentralized.

In 1942 and 1943 the Secretary, at his new domicile, indeed had visitors from the Gestapo and Sicherheitsdienst, but he succeeded in the defense and only some papers of less value were seized.

. . . Correspondence between Danish, British, Belgian and Dutch members of the Bureau is now going on. Meanwhile, these noncollaborating members of the Bureau have been invited to meet in London. We do hope that this meeting may be held before the end of the year . . . .

Winschoten, Holland — T. POTJEWIJD

AND THEIR BEST WAS SUPERB

Sirs:

Please send me copies of the Pharmacy Week talks . . . . Although registered in Minnesota I have been in service since March, 1942, and have been fortunate in being connected with my chosen profession most of the time. We didn't receive the proper recognition during the war as far as rank is concerned but it didn't keep us from doing our best.

For the last two and a half years I've been in charge of one of the pharmacies here at the Regional Hospital. Coming in contact with physicians from all parts of the country has given me a world of professional experience . . . .

Fort Benning, Ga. — T/4 RAYMOND JOHNSON

A NEW APPROACH TO PHARMACY WEEK

Sirs:

There has been some critical comment because the installation of Pharmacy Week window displays has not been more widespread. This raises the question as to whether the year's professional activity is to be reduced to something so transitory as a window display. It should not be difficult to engage a high-priced window decorator, buy some novel material, and win our A. PH. A. Pharmacy Week award. . . .

If Pharmacy Week is weak, it is because our concept of it is weak. If we are at all indicted, it is largely in the fallacy of our public approach, which is more in keeping with tradesmen than men of professional learning.

Suppose physicians and dentists were to display their working tools once each year and shout from the housetops how many operations they performed. Would we consider them possessed of greater professional responsibility?

Why not put the emphasis where it properly belongs? Give the Pharmacy Week award to the practicing pharmacist who has contributed most to our professional advancement. Take this award out of the window dressing class and give it real professional dignity. State pharmaceutical associations should do likewise.

Pharmacy Week should be devoted more to encouraging professional self-analysis, reviewing the adequacy of our health services, attending lectures at pharmacy colleges and delivering talks to lay groups on pharmacy. Times do change; we too should change our Pharmacy Week approach . . . which is not now a true yardstick of professional interest. . . .

Cliffside Park, N. J. — ARTHUR P. GROSMAN

GUIDE TO FDA LABELING REGULATIONS

Sirs:

We would like to obtain 25 copies of the practical guide to the new FDA labeling regulations which appeared on page 256 of the October PRACTICAL PHARMACY EDITION. . . .

We wish to supply each of our branch pharmacies with this article which we think covers the subject in a very fine way.

Buffalo, N. Y. — G. C. CAREY

A. Ph. A. has a limited number of reprints available for its members, which will serve as a convenient reference for dispensing under the new regulations.—THE EDITOR

NEW LIGHT ON AN OLD SUBJECT

Sirs:

Many years ago I was a member of the A. PH. A. but resigned because, judging from my observation, the organization seemed to be conducted along noninteresting and theoretical lines . . . . I must admit that reports in the PRACTICAL PHARMACY EDITION now indicate otherwise and the JOURNAL is very helpful to the practicing pharmacist. I therefore apply for reinstatement . . . .

Brooklyn, N. Y. — I. L. SOMMER

STRAIGHT FROM HEADQUARTERS

by ROBERT P. FISCHELIS, Secretary
AMERICAN PHARMACEUTICAL ASSOCIATION

PENICILLIN

WHILE some of the statements which have been made regarding an alleged shortage of penicillin are irresponsible, there is, nevertheless, a basis for public concern about a situation which leaves hospitals short of parenteral penicillin to be used for injection. During the latter part of October reports were received from hospitals to the effect that they were unable to obtain parenteral penicillin from their customary sources of supply and complaints were also received from civilian patients who were unable to purchase parenteral penicillin on prescriptions for injection by their physician in their own homes.

By the time this issue of the JOURNAL appears in print, the War Production Board or its successor, the Civilian Production Administration, will probably have resumed some form of control over the distribution of penicillin as a result of the shortage complained of. The October shortage was due to a number of causes, among which were the following:

(1) Deterioration of the quality of the corn steep liquor used in growing the mold. This is a situation which apparently cannot be remedied until a better quality of corn is available.

(2) The export demand for parenteral penicillin has been growing by leaps and bounds and the policy of the Foreign Economic Administration and its successor has been to provide penicillin to the rest of the world on the same basis that it was originally supplied to the citizens of the United States. Obviously, the growing demand for penicillin in the United States and the requirements of the rest of the world far exceed the supply obtainable from American manufacturers, even though American penicillin production may be increasing continuously.

(3) Considerable of the parenteral penicillin supplied in ampuls for injection is being used in the compounding of extemporaneous prescriptions calling for penicillin, as this is the only form that is available to the practicing pharmacist. It is clear, therefore, that all parenteral penicillin has not been used for injection.

(4) Some manufacturers have largely discontinued supplying penicillin in parenteral dosage form, since they considered it advisable to use their production in the manufacture of oral dosage forms of penicillin. Others have diverted considerable of their production to oral dosage forms.

(5) The increasing demand for penicillin in the treatment of venereal diseases under the supervision of Federal and state health departments, as well as in clinics, and in private practice.

So much for the cause of the shortage. As to the effect of the shortage, it is important for the medical and pharmaceutical professions and the drug industry to bear in mind that the public has become accustomed to having penicillin made available under controlled conditions. If the relaxation of controls is going to inconvenience the public or cause hardships in cases where parenteral penicillin is absolutely required and is not available, there is sure to be a demand, not only for a return of the original controls, but for a tightening of controls to the point where the supply and administration of the product may be surrounded by a good deal of regimentation.

Wise Self-Control Important

In every article on the distribution of penicillin which has appeared in this column we have stressed the importance of adequate self-control by the professions and the drug industry, and in the August issue of THIS JOURNAL, we ventured the statement that "controls now exercised by the WPB should definitely be continued until production has reached such a point that parenteral supply will always be sufficient, regardless of the extent to which other dosage forms may be required." The public, and particularly certain sections of the press, will be quick to emphasize the point that parenteral penicillin has

become highly competitive; that export business in penicillin may be more lucrative than domestic business; and that a shortage of penicillin in any form is apt to increase its cost to the ultimate consumer.

The pharmaceutical profession and the drug industry have made such an excellent record in penicillin distribution during the war years that it would be tragic if the sense of responsibility for the public health and welfare which guided all concerned up to the time that the original controls were removed should give way to a mad scramble for pecuniary advantage.

The situation calls for professional and industrial statesmanship of a high order, and we are certain that it is not beyond the ability of leaders in the profession and the industry to supply it.

CIVIL SERVICE

THE U. S. Civil Service Commission has just issued a circular entitled "The Federal Government Needs Pharmacists." The circular goes on to state that pharmacists are wanted in Washington, D. C., and throughout the United States for positions ranging in salary from $2320 to $2980 a year, both figures indicating the starting point of the respective classifications.

The information in the circular covers a description of the work, reference to a 40-hour work-week, sample questions and general information.

The sad and inexcusable portion of the announcement is that requirements to be met in order to be examined for these positions permit unqualified persons to apply for these positions. The circular states, under requirements: "At least three years of progressive technical experience in the practice of pharmacy, the major portion of which was in filling and compounding doctors' prescriptions, dispensing medicines, and performing other pertinent work connected with the operation of a pharmacy. The character and difficulty of the tasks performed, the amount of practice gained and the facility with which the work was done must show clearly that the applicant has (*a*) a knowledge of the fundamental principles of pharmacy, chemistry, therapeutics, pharmacology and related subjects and (*b*) a working knowledge of these subjects."

As an alternative to the three years of "progressive technical experience in the practice of pharmacy" the applicant may offer "a successfully completed full curriculum of study leading to a bachelor's degree in pharmacy in a college or in a university of recognized standing."

On the one hand applicants are solicited who have acquired the necessary formal education and training, and on the other the opportunity is given to any one with three years of experience to pass an examination presumably based upon the full formal training represented by a bachelor of science degree.

At this late date with 45 states in the Union requiring graduation from a four-year course in pharmacy leading to a bachelor of science degree as a minimum for licensure, it seems incongruous that the government of the United States should invite persons who have not met such a standard to an examination to qualify as pharmacists to practice in governmental institutions.

Are we to assume that the quality of pharmacy practiced in government institutions is lower than that to which the public is accustomed in private practice?

Is the U. S. Civil Service Commission deliberately ignoring the advances in the practice of pharmacy which have occurred in the past twenty-five years?

These are questions which must be raised in connection with the issuance of a call for pharmacists in the government service and in connection with the recent announcement of the U. S. Civil Service Commission that the duties of pharmacists are such that they can be performed by a person who does not meet the minimum educational requirements prescribed by the Commission for such positions. The latter announcement is a part of a statement on "formal education requirements for appointment to certain scientific, technical and professional positions" published by the Commission in the *Federal Register* for October 16, 1945.

In this statement there was published a list of positions for which formal education requirements are prescribed and the Commission stated in this announcement that "justification for prescribing minimum educational requirements for eligibility for appointment to the above listed positions is based upon the duties of the position, the knowledge requisite for the performance of such duties, and the method of obtaining the basic knowledge and training required." Pharmacists were not included in the list.

The entire profession should urge the members of Congress to investigate the reasons for this gratuitous insult to the profession of pharmacy and the reasons for depriving people in governmental institutions from receiving the same high grade of pharmaceutical service to which they are accustomed in private life.

A. PH. A. HOLDS
CONFERENCE ON BARBITURATES

PHARMACISTS, PHYSICIANS AND HEALTH AUTHORITIES CONVENE IN WASHINGTON TO INAUGURATE PROGRAM TO CURB THE MISUSE OF BARBITURIC ACID COMPOUNDS

THROUGH a program inaugurated by the Committee on Legislation of the AMERICAN PHARMACEUTICAL ASSOCIATION, pharmacy has come to grips with the problems arising from misuse of barbiturates. To lay the foundation for this program a conference was called to put on record the opinion and experience of various interested groups and explore possible methods of action.

Sitting around the conference table at A. PH. A. headquarters in Washington on October 12 were top representatives of the American Medical Association, American Dental Association, American Hospital Association, U. S. Public Health Service, U. S. Bureau of Narcotics and U. S. Food and Drug Administration, as well as state law enforcement officials and representatives of retail, wholesale and manufacturing groups in pharmacy.

In opening the Conference, Chairman A. L. I. Winne of A. PH. A.'s Committee on Legislation, who presided, summarized the contributing factors to the problem. Among these were careless prescribing and dispensing by some physicians and their office assistants, uncontrolled renewal of prescriptions and over-the-counter sales where there are no state laws covering barbiturates and bootleg distribution where there are laws.

Dr. Robert P. Fischelis, A. PH. A. secretary, then presented on behalf of the Committee on Legislation a review of the present status of barbiturate regulation and summarized the provisions of existing laws. He also presented to the Conference results of an opinion survey made among state pharmacy officials and practicing pharmacists on the proper methods of control.

To determine what action would finally be taken, it was emphasized, the A. PH. A. Committee on Legislation would carefully weigh the factual data and the opinions presented to the conference as a basis for recommendations to the ASSOCIATION'S Council.

Leading off the discussion by medical experts present, Dr. Robert H. Felix, chief of the Mental Hygiene Division of the U. S. Public Health Service, spoke on habituation and tolerance.

He classified habituations to the barbiturates into four groups:

1. Persons who are psychologically normal but have been given medication during an illness over a sufficient length of time to become habituated.

2. Psychoneurotic persons of various types who have fundamental personality difficulties. Resulting symptoms cause them to lose sleep and be tense and nervous. They are able to escape from themselves to a greater or lesser degree by using barbiturates.

3. Persons with psychopathic personalities but without psychoses. Use of barbiturates by this group has been called "an effort to make a big man out of a little man," at least psychologically, or to put him in a position where he doesn't worry about being a little man.

4. Persons with associated psychoses.

Speaking of underworld use of barbiturates, where they are called "goof balls" or "yellow jackets," Dr. Felix pointed out that in his experience many narcotic addicts either began their addiction or relapsed to narcotic addiction through barbiturates.

As to tolerance it is believed that this effect, in the sense of a lessening response from repetition of a given dose, is slight.

Following the remarks of Dr. Felix, Commissioner H. J. Anslinger of the U. S. Bureau of Narcotics discussed the law enforcement problem from the standpoint of his long experience in the control of narcotic drugs.

England was faced with a similar problem concerning the barbiturates, he pointed out, and subsequently adopted special legislation which brought the situation under control. During the war, however, the British Ministry of Health repeatedly found it necessary to remind the public that too much of the hypnotics was being used.

Commissioner Anslinger agreed that the prob-

lem in this country has become serious, and mentioned that probably about a thousand cases per year are reported to his Bureau which are closed when it is discovered that the drug involved is a barbiturate rather than a narcotic.

Better control should be attempted on the state level, he suggested, indicating that legislation similar to that in Maryland should prove satisfactory.

Opening a series of discussions on medical aspects of the problem, Chairman Winne next introduced Dr. Austin Smith, secretary of the Council on Pharmacy and Chemistry of the American Medical Association. He emphasized that an essential part of any program was continuous education of both physicians and pharmacists on their responsibilities in connection with the distribution of drugs.

Recognizing that barbiturates are being handled unwisely by some members of both the pharmaceutical and medical professions, Dr. Smith favored the proposal of securing effective state regulation, preferably through a uniform law.

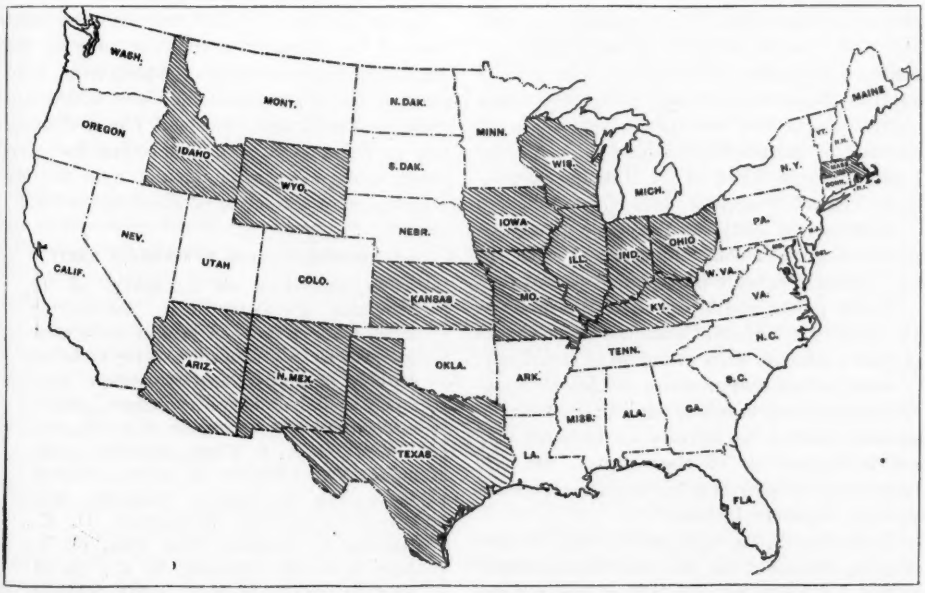
In commenting on harmful effects from excessive use of barbiturates, he emphasized the importance of comparative studies of the effects of specific barbiturates rather than referring to these compounds as a group.

Dr. Robin C. Buerki, chairman of the Council on Professional Practice of the American Hospital Association, mentioned the importance of reducing record keeping to a minimum in connection with the control of drugs, but expressed appreciation of the problem connected with barbiturates. The hospitals could be counted on, he said, to cooperate in any soundly conceived program.

Speaking for the dental profession, Dr. Donald A. Wallace, secretary of the Council on Dental Therapeutics of the American Dental Association, voiced the interest of dentists in proper control of habit-forming drugs but indicated that promiscuous distribution could not be associated to any extent with dental practice because of the limited use of such products by that profession.

As the morning session of the Conference drew to a close it was evident that common ground for agreement on the different phases of the barbiturate problem would not be difficult to find, despite the many viewpoints represented at the meeting. There seemed to be general agreement that the interchange of information and opinions would go far toward bringing about a common understanding of the special problems of individual groups.

Opening a series of discussions by pharmaceu-



STATES HAVING NO BARBITURATE LAW are indicated by cross hatch markings on the above map. Fourteen states and the District of Columbia have no legislation, and a survey by the A. Ph. A. Committee on Legislation revealed wide variation in regulatory provisions elsewhere.

tical representatives, Prof. Robert C. Wilson of the University of Georgia College of Pharmacy expressed great concern over the possible unfavorable reaction toward pharmacy caused by derelictions of a few members of the profession.

Although supporting state control, Prof. Wilson voiced some misgivings on the possibility of effective enforcement. Because of the important sociological and health problems involved, he stated that the professions would have to support whatever barbiturate legislation proves necessary for adequate control however stringent it may be.

Since there is an underworld interest and traffic in these drugs, the opinion was expressed that control would involve more than the regulation of the professions. It was his feeling that a licensing system for manufacturers should also be a part of any system to control distribution.

Mr. Carson P. Frailey, executive vice-president of the American Drug Manufacturers' Association, attributed current interest in the regulation of the distribution of barbiturates to a wave of suicides and accidental deaths resulting from overdoses. He advocated state, rather than Federal, legislation, and expressed the view that an investigation of the beneficial effects of barbiturates would offset much of the sentiment against the use of such products occasioned by sensational reports of their misuse.

Other participants in the Conference on the pharmaceutical aspects of the problem included Mr. P. H. Costello, secretary of the National Association of Boards of Pharmacy, who pointed out the difficulties of adequate enforcement under pharmacy acts and barbiturate laws which are enforced by Boards of Pharmacy; Mr. George Frates spoke in behalf of the National Association of Retail Druggists; Mr. H. M. Bingham represented the National Wholesale Druggists' Association; and Mr. John A. Crozier of the Federal Wholesale Druggists' Association.

On the public health aspects of the problem, Dr. Ernest L. Stebbins, Commissioner of Health of New York City drew attention to experiences in metropolitan centers where accidental deaths and suicides from misuse of barbiturates have apparently been on the increase, as compared with the legitimate use of these drugs. He also touched upon the effect of barbiturates on persons who are criminally inclined.

Dr. Robert P. Herwick, chief of the Division of Drug Control of the Food and Drug Administration, expressed the view that misuse of barbiturates is rather widespread, and he included over-the-counter sales in his definition of the term "misuse." He indicated that inspectors of the Food and Drug Administration have found it difficult to purchase barbiturates from most pharmacists, which is an indication that considerable quantities are obtained by the public through bootleg channels. He pointed out that the Food and Drug Administration cannot be expected to control the distribution of these drugs alone and, like Commissioner Anslinger, explained that Congressional appropriations are very difficult to obtain for enforcement purposes. This is responsible for the reduction in personnel for control work. It was his opinion that adequate enforcement of regulations governing the sale of barbiturates would have to be conducted at the state level for the present to be effective, and stressed the importance of concerted enforcement under all existing statutes.

Other comments on the legal and public health aspects were made by Mr. Leslie C. Jayne, New York State Board of Pharmacy, Mr. Walter Scofield, chief of the Bureau of Food and Drugs of the New Jersey State Board of Health, Mr. W. A. Queen, chief of the Division of State Cooperation of the Food and Drug Administration, and Mr. J. W. Holloway of the American Medical Association.

Mr. Charles V. Imlay, representing the National Conference of Commissioners of Uniform State Laws, offered cooperation in formulating and promoting uniform state legislation for control of the distribution of barbiturates.

At the conclusion of the Conference the members of the Committee on Legislation of the AMERICAN PHARMACEUTICAL ASSOCIATION summarized the suggestions and views which had been presented, and Chairman Winne thanked the participants at the Conference for their contribution in securing factual data for the preparation of a program of action in this field.

COMMITTEE MAKING BARBITURATE STUDY

The Committee on Legislation of the AMERICAN PHARMACEUTICAL ASSOCIATION which made a study of present barbiturate laws, conducted the opinion survey on better methods of control, held the unique interprofessional barbiturate conference, and is now formulating a program of action, consists of: A. L. I. Winne, chairman, Richmond, Va.; Martin E. Adamo, Boston, Mass.; A. G. DuMez, Baltimore, Md.; George A. Frates, Washington, D. C.; Nicholas S. Gesoalde, New York, N. Y.; John A. Goode, Asheville, N. C.; L. M. Kantner, Baltimore, Md.; H. H. Schaefer, Brooklyn, N. Y.; R. L. Swain, New York, N. Y.; and Robert P. Fischelis, Washington.

Thiouracil

REMEDY FOR HYPERTHYROIDISM MAY SOON BE ON PRESCRIPTION SHELVES BUT STATUS REMAINS IN DOUBT DUE TO ITS TOXICITY

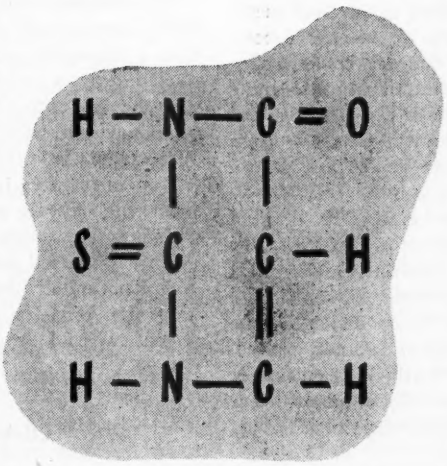
by W. B. BAKER

WHEN over-function of the thyroid gland occurs in the animal or human body, an excessive amount of thyroid hormone is produced and released into the body. This results in a state of hyperthyroidism, or thyrotoxicosis.

The hyperthyroidism in human beings is usually manifested by an increased metabolic rate, various nervous effects, loss of weight, sometimes an increased pulse rate and other symptoms.

In human beings, although hyperthyroidism is considered to be widely prevalent, many cases are not sufficiently serious to require hospitalization. In fact, in a number of the mild cases the disease may abate spontaneously. Therefore, it is not a reportable disease, and statistics on incidence are not easily obtained.

When hyperthyroidism or thyrotoxicosis is sufficiently serious to require hospitalization the usual subsequent therapy, until recently, has been "subtotal surgical resection" of the hyperfunctioning gland—in other words, partial removal of the thyroid gland.



Thyroidectomy is a serious operation in hyperthyroid patients because such individuals have a high metabolic rate and, consequently, are often poor surgical risks. Although hyperthyroidism is essentially a medical problem, the subject had been relatively dormant for years because there had not been a suitable medical treatment available. Iodine has been employed, but experience has shown that the basal metabolic rate and clinical toxicity cannot be returned to normal by iodine in the majority of cases.

More recently, however, it has been observed that certain drugs or compounds are capable of suppressing thyroid activity by inhibiting the formation of thyroid hormone and decreasing the basal oxygen consumption in the body. In animal experiments it was noted that certain sulfonamides, as well as thiourea and its derivatives, induced a hypometabolic state when fed to rats for several weeks.[1–4] According to accumulated evidence, the lowering of the metabolic rate results from a decrease in the production of thyroid hormone, which is presumably due to the antithyroid action of these drugs.

The earliest interest in thiourea as a medicinal hope in the treatment of hyperthyroidism actually began about the time that Kennedy and Purves[5] demonstrated that brassica seeds (i.e., rape seeds) were capable of producing thyroid enlargement in animals. The thiourea content of the rape seeds was responsible for the goitrogenic effects. Other investigators[1, 2, 6, 7] obtained similar results in animals by using various substances related to thiourea.

Condensed from a paper in the *Scientific Edition* of THIS JOURNAL (34:249, 1945). Received from the Calco Chemical Division of the American Cyanamid Company.

Although the Mackenzies[1] made the original observations which led to the first clinical application of thiouracil, the real development of thiouracil therapy began with Astwood and his colleagues.[2] These latter investigators confirmed the earlier work[3] showing that sulfaguanidine produced hyperplasia and other changes in rats. They explained that thyroid hormone cannot be synthesized at a normal rate because of the action of sulfaguanidine or thiourea, consequently a deficiency of the hormone arises. As a result of this deficiency the anterior pituitary secretes more thyrotropic hormone and, in turn, this causes thyroid enlargement and hyperplasia.

After the Mackenzies[1] and Astwood[3] showed that thiourea and related compounds affect the thyroid gland in a striking and peculiar manner, the latter investigator tested over 100 compounds, which included a large number of thioureas as well as sulfonamides (sulfanilamide, sulfaguanidine, sulfadiazine) and other substances. He found that thiouracil was more active than any one of them. The minimum lethal dose of thiouracil in rats was more than 100 times the dose necessary to produce a detectable thyroid effect.

A new therapeutic principle was introduced by Astwood when he reported[9] that three hyperthyroid patients treated with thiourea and thiouracil reacted favorably while the therapy was continued. Beneficial results achieved were: relief of symptoms, a decline of the basal metabolic rate to normal limits, an increase in body weight and an increase of the body cholesterol.

The actions of thiourea and thiouracil are quite similar. However, thiouracil does not give the patient an unpleasant breath, does not cause vomiting or conjunctivitis, causes less gastrointestinal disturbance and it is less toxic.[9, 11, 12] Thiouracil has therefore become the drug of choice in treatment of thyrotoxicosis up to the present, although other derivatives are under study and may prove less toxic.

Although the ability of thiouracil to reduce the basal metabolic rate has been definitely proved, no claim for the cure of hyperthyroidism has been made up to now. Permanency of improvement and end results of thiouracil therapy have not yet been demonstrated.[15]

On the other hand, it is stated that clinical remission and the normal basal metabolic rate can be maintained, apparently, as long as thiouracil therapy is employed; but if therapy is discontinued after a few weeks, a relapse usually appears within two to four weeks.[14] It is thought possible that certain types of hyperthyroidism appearing during stress (puberty, adolescence, menopause) may yield permanent results in treating the disease, while others will not.[16] Evidently drug resistance to thiouracil is not manifested during therapy, since no cases have been reported.

Chemistry and Properties

Thiouracil (2-thiouracil) is a heterocyclic derivative of thiourea. (It is the sulfur analogue of urea.) Thiouracil, a white crystalline powder, is soluble in alkaline solutions, slightly soluble in water (approximately 1:2000) and insoluble in acid, ether and ethyl alcohol. It is relatively stable either in powder form or in solution, odorless, and has a bitter taste.

Thiouracil, $C_4H_4N_2OS$, has the structural formula shown on the preceding page.

Absorption, Distribution, Excretion

The major portion of thiouracil absorption[14] probably occurs in the stomach and duodenum, since the drug appears in the blood in appreciable quantity very rapidly; only a small proportion of the drug is found distal to the duodenum. The duodenum and jejunum can absorb the drug very rapidly. Although some thiouracil is broken down in the gastrointestinal tract, none of the drug is excreted in the stools.

When incubated with the drug *in vitro*, the contents of the stomach, duodenum and jejunum exhibit a destructive action. The gastrointestinal tract destroys approximately 15% of the usual clinical dose (0.1 to 0.2 Gm.) of the drug, and the remainder is distributed throughout essentially all body fluids and tissues.

More of the drug is excreted when 0.2 Gm. is given once or twice a day than when 0.1 Gm. is given twice as often.

When thiouracil therapy is discontinued, the drug is not usually demonstrable in the blood or urine after three days; only a small amount is present twenty-four hours after the discontinuation.

Clinical Studies

ACTION.—The effects of thiouracil when administered to thyrotoxic patients are (*a*) a lowering of the metabolic rate to normal levels, (*b*) a return to normal of the protein-bound iodine of the plasma, (*c*) concurrently a clinical remission of the disease.

It is said to be an accepted view that the symptoms of thyrotoxicosis, which are due to excessive

production of thyroid hormone, can be controlled by thiouracil administration.[19] Although the primary action of the drug centers on the inhibition of thyroid hormone production,[1, 2] the exact mode is unknown.

Apparently the site of action is within the gland itself, since it has been shown that thiouracil does not destroy or neutralize thyroxine nor does thiouracil have a "paralyzing" effect upon the tissue structures which might modify the hormonal action. (Animal experiments have demonstrated that thiouracil's systemic effects could be prevented by simultaneous administration of the thyroxine.) However, there is more recent evidence[10] that does indicate an interference with thyroxine production by the follicular cells of the thyroid gland. The mode of action of thiouracil in depressing the functional activity of the thyroid gland is still considered to be largely conjectural.[21] At any rate it is paradoxical, inasmuch as the drug induces thyroid hyperplasia with diminished iodine content of the gland and is accompanied by a decrease of the hormonal secretion.

EFFECT ON THE THYROID GLAND.—A deficiency of iodine, due either to low iodine intake or to ingestion of substances which interfere with iodine metabolism, will produce a goiter. Other substances, including certain cyanides, thiocyanates, etc., are also known to be goitrogenic.

Williams[14] feels that it is strange that thiouracil, as well as the other drugs employed in the treatment of thyrotoxicosis, should be spoken of as an antithyroid drug. Because even though the drug inhibits the function of the thyroid gland, it may increase the work of the gland, as shown by the hyperplasia sometimes produced.

There is some difference of opinion as to what effect thiouracil has on the size of the thyroid gland. One view is that the size of the gland increases (or at least there is an absence of decrease) during thiouracil therapy, especially during the initial treatment. This is apparently due to the fact that the drug prevents the synthesis of thyroxine.

One group of investigators,[22] as a result of their observations in several thyrotoxic patients, express the opinion that when thiouracil is used in excessive quantities, a still greater enlargement of the thyroid gland may result. The possible explanation[22] is as follows: When the production of thyroid hormone is markedly inhibited, an excessive production of thyrotropic hormone results. This in turn causes hyperplasia of the acinar cells of the thyroid and certain manifestations of malignant exophthalmos. (In such cases, it may be advisable to reduce the thiouracil dosage.)

According to the summary observations of Williams,[14] the thyroid gland generally does not change appreciably in size or consistency during the first six weeks of thiouracil therapy. In some patients the gland becomes firmer and larger, in some it gets smaller and softer, and in others there is no change.

It was also observed[23] that patients treated with thiouracil for as long as fifteen days tended to have, as determined immediately after thyroidectomy, as great a concentration of thiouracil in the glands as did those treated for longer periods of time. The values of thiouracil ranged from 5 to 39 mg. % of dried gland. It was also noted that previous iodide therapy usually had no effect on the amount of thiouracil present.

It is presumed[11] that the thyroid gland hyperplasia which occurs with thiouracil therapy is a secondary phenomenon, described as a "hyperplasia of frustration" occurring in response to the induced relative *hypo*thyroidism. However, it is stated[14] that the early fears of the goitrogenic effects of thiouracil seriously handicapping its use are no longer justified.

THIOURACIL VS. IODINE.—Iodine and thiouracil are the only antithyroid substances which have been given much consideration clinically. Although iodine has been somewhat helpful in the treatment of certain thyrotoxic patients, it has several disadvantages. For instance, sometimes the thyrotoxicosis is refractory to iodine, either at the beginning of treatment or after prolonged iodide therapy. Also, with iodine, there is only partial improvement in many patients. The exact action of iodide in the treatment of hyperthyroidism is obscure, and there is a need for a drug with stronger antithyroid action.[14]

Some thyrotoxic patients who receive iodine or iodide prior to treatment with thiouracil tend to be resistant to thiouracil therapy, especially during the first few weeks.

When thiouracil is given concomitantly with iodide, improvement of the patient may occur although, generally, the response may be slower than when thiouracil alone is used. In those cases where the response to thiouracil is retarded because of prior iodine administration, the dosage of the thiouracil should not be increased. Patients treated for several weeks with thiouracil and without iodine usually have an extremely smooth course.[14, 23]

In an attempt to make the thyroid gland more suitable for surgical removal, Bartels[4] employed

Lugol's solution in conjunction with thiouracil. He believes that further experience is needed to achieve proper evaluation.

In the patients observed by Rawson, *et al.*,[20] the best clinical responses to thiouracil were in those rather acute cases which had had no previous treatment with iodine. Patients who had received iodine previous to thiouracil treatment made much slower responses to the drug. A probable explanation of the delayed action in the latter cases is that considerable stored hormone continues to come out (after the start of thiouracil therapy) even though new hormone does not.

A number of differences may be noted in comparing thiouracil with iodine. Thiouracil causes a complete remission in every instance if continued long enough. Iodine does so in only 50% of the cases, another 30% to 40% showing partial remission and the remainder no effect at all. The speed of remission is much greater (2 to 6 times faster) with iodine but the situation is only controlled temporarily. In the case of thiouracil, the metabolism is controlled as long as the drug is continued. Iodine, however, is said to have an advantage in being less toxic.[25]

There is a slower drop in the basal metabolic rate of patients who have received iodine before thiouracil administration. Many patients, especially those who are more toxic and who have had hyperthyroidism for a longer time, fail to respond sufficiently to permit surgery without risk when iodine is used preoperatively. In such patients, usually the thyroid gland is large, the basal metabolic rate is high, considerable weight loss indicates widespread visceral strain, and at times cardiac complications occur.[24, 26]

It was considered significant that in three of nine cases in which unfavorable results were achieved with thiouracil, iodine treatment had been given previously. Furthermore, two of the three patients had been treated with thiouracil for only three weeks, and the third patient for four weeks, then the drug had been stopped. Consequently, this relatively short treatment time in patients who had been on iodine therapy might have accounted for failure to show an effect on the pulse rate.[12]

Thiouracil lowers the basal metabolism faster than Lugol's solution, therefore it is more useful than iodine in controlling hyperthyroidism. This was shown in a study of nine hyperthyroid patients by McGregor,[13] who also stated that previous iodine treatment (Lugol's solution) retards the effect of thiouracil. This investigator noted a definite subjective improvement in the patients within a few days following thiouracil administration. He also stated that thiouracil seems to be the ideal treatment for postoperative recurrent hyperthyroidism.

Watson and Wilcox[15] point out that, whereas persistent iodine therapy develops into refractoriness, according to present evidence this tendency does not appear to be the case when thiouracil is employed. These investigators also call attention to the much slower response to thiouracil in patients who have been treated with iodine.

EXOPHTHALMOS.—Thiouracil has no appreciable effect on the exophthalmos ("popping out" of the eyes) manifested by thyrotoxic patients, according to the observations of certain investigators.[12, 27]

An exaggeration of exophthalmos, or an increase in size of the goiter, may possibly occur if thiouracil is administered until the basal metabolic rate is below normal. It is probable that this may be avoided by administering desiccated thyroid, $\frac{1}{2}$ to 1 gr. per day, beginning the administration when the basal metabolic rate has been within normal range for a week or two.[16]

Means and his colleagues[22] contend that the manifestations of malignant exophthalmos may be accentuated during thiouracil therapy. Williams[14] states that exophthalmos of the nonmalignant type usually shows marked improvement or disappearance during the first few weeks of treatment with thiouracil, whereas the malignant type often increases in severity.

Preoperative Use of Thiouracil

In the preoperative treatment of hyperthyroid patients, the return of the basal metabolic rate to near normal levels would imply an ideal operative state with a minimum of anesthesia and postoperative reaction.

Experience has shown that in severe hyperthyroidism iodine cannot return the basal metabolic rate and clinical toxicity to normal. Thiouracil will accomplish this. Therefore, thiouracil is favored by a number of clinicians as a preoperative adjunct in the severely sick patient.

Thiouracil vs. Surgery

It has been known for a long time that subtotal thyroidectomy in the treatment of thyrotoxicosis, while affording a measure of relief, has not been the final answer. Consequently, the discovery of thiouracil as a potentially successful medical treatment, to employ instead of surgery, has been of great interest to clinicians.

The chief advantage of treatment with thiouracil is the possibility of controlled suppression

of thyroid hyperactivity and the ready reversibility of the drug. In spite of the possible necessity for permanent treatment and the possible toxic reactions of the drug, it is often preferable to subtotal thyroidectomy because of the risk of surgery and the dangers of postoperative myxedema and residual thyrotoxicosis. However, some workers[11] are of the opinion that it is still a little too early to determine whether thiouracil will prove to be a satisfactory substitute for the surgical treatment of diffuse toxic goiter because of the relatively limited experience with the drug.

With thiouracil therapy at hand, some patients may not have to be thyroidectomized. This viewpoint was adopted after a study[13] of nine patients who were successfully treated with the drug. As a result of the study, the clinician expressed the opinion that thiouracil would be the ideal treatment where a patient is not a good operative risk, i.e., as in severe hypertension and in patients with psychotic tendencies.

Dosage and Administration

When Astwood[9] originally recommended thiouracil in the treatment of hyperthyroidism, he suggested a daily oral dosage of 0.2 to 1.0 Gm. (average 0.5 Gm.) daily, to be lowered as the basal metabolic rate falls. In the few patients observed at that time, he noted this amount of drug effected a relief of symptoms, and a return to normal of the serum cholesterol and basal metabolic rate. He observed a latent period of one to two weeks before the effects occurred, a sustained remission during treatment, then a return of the hyperthyroidism when the drug was discontinued which suggests that continued administration is necessary to control hyperthyroidism.

Based on the above several cases, Astwood felt that possibly 1 Gm. of the drug daily was excessive.

Other clinicians employed essentially the dosage advocated by Astwood. For instance, Rawson, *et al.*,[20] treated patients by administering an initial dose of 0.6 Gm. per day by mouth, with a reduction to 0.4 Gm. per day after the basal metabolic rate had dropped halfway to normal.

To determine the correct maintenance dose for each patient, it has been suggested that the use of thiouracil be controlled by determining the patient's basal metabolic rate every ten days. The source of this suggestion[19] reports that the initial dose of thiouracil is usually 0.1 Gm. given five times a day for ten to fourteen days, after which the symptoms are greatly improved, the heart rate and basal metabolic rate fall and the body weight goes up. Then, after three weeks on the initial dosage, it is usually necessary to reduce the dose to 0.2 or 0.3 Gm. daily.

In 32 patients treated with thiouracil,[12] the dosage was 0.2 Gm. administered five times daily, and the average duration of the initial course of treatment was twenty-nine days. Much smaller maintenance doses were required than for establishing control. It is felt that the use of thiouracil should be reduced to the minimum required to maintain the weight of the patient.

Williams[14] outlines a regimen for thiouracil therapy as follows: The beginning dosage is usually 0.4 to 0.6 Gm. daily; after two weeks it is 0.3 or 0.4 Gm. daily; after a normal basal metabolic rate is obtained it is 0.2 or 0.3 Gm., and after a total of about two months of thiouracil therapy only 0.1 or 0.2 Gm. daily is given. From the point of view of ideal therapeutic effectiveness it would seem that thiouracil should be administered every three hours, day and night, but such a regimen is inconvenient and is not a necessity. In fact, a satisfactory response is obtained if no more than three doses per day are given.

LENGTH OF THIOURACIL THERAPY.— There is a variable latent period, following the initiation of thiouracil treatment, before the metabolic rate begins to fall. Eventually clinical improvement is subjectively and objectively apparent. The fall in basal metabolic rate and amelioration of symptoms of hyperthyroidism are maintained as long as the drug is continued.

Some clinicians are of the opinion that hospitalization is unnecessary during treatment and that the majority of patients can continue with their daily work.[23] Others[12, 15] feel that the drug should be given only under strict control, inasmuch as it is powerful and potentially dangerous.

Toxicity

In Astwood's studies on rats, using more than 100 compounds, thiourea appeared to be the least toxic substance of the entire series.[3] However, thiouracil was the most highly active compound tested. As stated previously, thiouracil has other advantages over thiourea. Other animal studies[10] on rats appeared to show that thiouracil is relatively nontoxic, although certain toxic effects occurred with continued large doses.

The experiences of clinicians, who have observed thyrotoxic patients for toxic manifestations during thiouracil therapy, have been varied. One clinician[14] states that toxic reactions to thiouracil appeared in about 10% of the patients, usually during the first five weeks of

treatment. Many investigators have reported that thiouracil is well tolerated.[13, 15, 24]

Toxic reactions reported due to thiouracil in some cases have included skin rashes, urticaria, fever, headache, vomiting, diarrhea, blood changes, swelling of lower extremities, arthritis, enlargement of lymph glands, leukopenia and agranulocytosis. The only serious toxic reactions are leukopenia and agranulocytosis. A recent survey shows an incidence of agranulocytosis of 3% in 5000 cases treated.

The toxic reactions, except in the case of agranulocytosis, rapidly disappear when thiouracil is discontinued or, in some cases, when the dose of the drug is reduced.

SUGGESTIONS FOR CONTROLLING AND COMBATING TOXICITY.—It has been suggested[31] that the use of thiouracil be controlled by periodic counts of the white blood cells. Mention was made of two cases, in which a marked drop of the white blood cells to 2000 per cu. mm. with 5% lymphocytes followed a short course of treatment with thiouracil.

Himsworth[32] advises that the white cell count should not be disregarded during thiouracil therapy and that the drug cannot be continued safely if the neutrophils in the blood are falling. This clinician is of the opinion that such precautions would be valuable as a possible guide in preventing agranulocytosis in certain patients.

The need for a method of overcoming serious side reactions due to thiourea and thiouracil administration has been recognized.

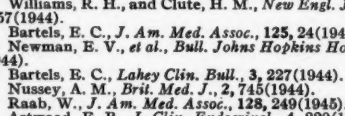
Goldsmith, *et al.*,[33] suggested the use of liver or folic acid in the prevention and treatment of granulocytopenia when this toxic reaction is induced by thiourea.

Other investigators[34] expressed the hope that agranulocytosis might be prevented by administration of crude liver extract. Williams and Clute[23] used large doses of crude liver extract and pentnucleotide to combat this complication.

When a 10% solution of pyridoxine hydrochloride in physiological sodium chloride solution was used in three cases of toxic agranulocytic angina (one of which developed about two months after thiouracil therapy for hyperthyroidism was instituted) the results suggested that pyridoxine administered intravenously is a useful agent in this complication.[35]

REFERENCES

1. Mackenzie, C. G., and Mackenzie, J. B., *Endocrinology*, **32**, 185(1943).
2. Astwood, E. B., *et al.*, *Ibid.*, **32**, 210(1943).
3. Mackenzie, J. B., *et al.*, *Science*, **94**, 518(1941).
4. Keston, A. S., *et al.*, *J. Biol. Chem.*, **152**, 241(1944).
5. Kennedy, T. H., and Purves, H. D., *Brit. J. Exptl. Path.*, **22**, 241(1941).
6. Kennedy, T. H., *Nature*, **150**, 223(1942).
7. Richter, C. P., and Clisby, K. H., *Proc. Soc. Exptl. Biol. Med.*, **48**, 684(1941); *Arch. Path.*, **33**, 46(1942).
8. Astwood, E. B., *J. Pharmacol.*, **78**, 79(1943).
9. Astwood, E. B., *J. Am. Med. Assoc.*, **122**, 78(1943).
10. Rawson, R. W., *et al.*, *Ann. Internal Med.*, **19**, 829 (1943).
11. Paschkis, K. E., *et al.*, *J. Clin. Endocrinol.*, **4**, 179 (1944).
12. Himsworth, H. P., *et al.*, *Brit. Med. J.*, **1**, 852(1944).
13. McGregor, J. K., *Can. Med. Assoc. J.*, **51**, 37(1944).
14. Williams, R. H., *Arch. Internal Med.*, **74**, 479(1944).
15. Watson, E. M., and Wilcox, L. D., *Can. Med. Assoc. J.*, **51**, 29(1944).
16. Soskin, S., and Levine, R., *Arch. Internal Med.*, **74**, 375 (1944).
17. Bissell, A., and Astwood, E. B., *Federation Proc.*, **3**, 5 (1944).
18. Williams, R. H., *et al.*, *Am. J. Med. Sci.*, **207**, 701 (1944).
19. Letters, Notes, and Answers, *Brit. Med. J.*, **1**, 313 (1944).
20. Rawson, R. W., *et al.*, *J. Clin. Endocrinol.*, **4**, 1 (1944).
21. Astwood, E. B., and Bissell, A., *Endocrinology*, **34**, 282(1944).
22. Means. J. H., *et al.*, *Trans. Assoc. Am. Physicians*, **56**, 67(1941).
23. Williams, R. H., and Clute, H. M., *New Engl. J. Med.*, **230**, 657(1944).
24. Bartels, E. C., *J. Am. Med. Assoc.*, **125**, 24(1944).
25. Newman, E. V., *et al.*, *Bull. Johns Hopkins Hosp.*, **74**, 152(1944).
26. Bartels, E. C., *Lahey Clin. Bull.*, **3**, 227(1944).
27. Nussey, A. M., *Brit. Med. J.*, **2**, 745(1944).
28. Raab, W., *J. Am. Med. Assoc.*, **128**, 249(1945).
29. Astwood, E. B., *J. Clin. Endocrinol.*, **4**, 229(1944).
30. Meyer, A. E., *et al.*, *Proc. Soc. Exptl. Biol. Med.*, **55**, 221(1944).
31. Friedmann, I., *Brit. Med. J.*, **1**, 446(1944).
32. Himsworth, H. P., *Ibid.*, **2**, 829(1944).
33. Goldsmith, E. D., *et al.*, *J. Am. Med. Assoc.*, **125**, 847 (1944).
34. Lozinski, E., and Simonovitch, J., *Can. Med. Assoc. J.*, **5**, 422(1944).
35. Cantor, M. M., and Scott, J. W., *Science*, **100**, 545 (1944).



NEW SKIN DISEASE PARTLY DUE TO SENSITIVITY TO QUINACRINE

A new skin disease, named atypical lichen planus, has been under study by the Army's Office of the Surgeon General. Quinacr ne (atabrine) was believed to be the underlying cause by Maj. Thomas Nisbet and Lt. Col. Charles Schmitt, Army dermatologists who submitted the first descriptions of the disease from the Southwest Pacific area.

Although other medical officers also believe that atypical lichen planus arises partly because of an unusual sensitivity to quinacrine, it is emphasized that other factors are contributory. Among these are skin injuries and irritations, excessive exposure to sunlight, profuse perspiration, dietary deficiencies and emotional and nervous factors.

Since the disease appeared in only about 2 or 3 persons per thousand among those who took quinacrine regularly for some months, the usefulness of the drug in malaria will not be restricted.

Atypical lichen planus is not contagious and is usually cured promptly under proper treatment.

HYDROPHILIC OINTMENT U. S. P. XIII

by LOUIS C. ZOPF*

VEHICLES for the topical application of medicinal substances vary from liquid and powdered preparations to the early and extensively used goose grease and lard. The more recent and universal use of solid petrolatum per se and combined with other oleaginous and waxy substances has to a certain extent been replaced by the newer emulsified washable creams or bases.

This does not necessarily indicate total abolition of the older type ointments but is indicative of advanced study in the field of pharmaceutical research for more effective forms of medication. The application of ointments on abraded or diseased areas of the skin has for its chief purpose the release of a medicinal substance to that area. That the availability of the therapeutic agent is greater in the new type bases than in the entirely oleaginous or petrolatum bases has been repeatedly proved by both clinical and laboratory evaluation.

The Thirteenth Revision of the United States Pharmacopœia will include an ointment vehicle of this newer type under the title Hydrophilic Ointment. The formula, a hydrous emulsified and "washable" (easily removable with water) base, has been accepted after careful consideration of many combinations suggested in the literature and after a series of laboratory and clinical investigations at the State University of Iowa College of Pharmacy and the University of Iowa Hospitals and elsewhere.

The formula proposed for inclusion in the U. S. P. XIII is as follows:

HYDROPHILIC OINTMENT

Stearyl Alcohol	250	Gm.
White Petrolatum	250	Gm.
Glycerin	120	Gm.
Sodium Lauryl Sulfate	10	Gm.
Methyl Parahydroxybenzoate	0.25	Gm.
Propyl Parahydroxybenzoate	0.15	Gm.
Distilled Water	369	Gm.
To make about	1000	Gm.

Melt the stearyl alcohol and white petrolatum on a water bath and warm to 75° C. Dissolve the sodium lauryl sulfate, propyl parahydroxybenzoate and methyl parahydroxybenzoate in the glycerin and water, warm to 75° C., and add this solution, with stirring, to the warm stearyl alcohol and white petrolatum. Stir the ointment until congealed.

Other formulas of similar composition may also prove efficacious as ointment bases, but the above formula has been selected because it contains a minimum number of ingredients, is relatively inexpensive to compound and possesses the factor of simplicity of manufacture.

While mechanical agitation is suggested, the base can, in small quantities, be readily prepared by manual stirring. The molten mixture thickens between 45° and 50° C. indicating good stability. The base has good consistency and spreads easily upon application.

Ointments prepared from it when applied to the skin are all easily removed with water. Removal of stains on bed linens resulting from ointments prepared with this type of base are more readily removed than those containing a high oil phase.

Our studies have revealed that, in formulas based upon combinations similar to that in Hydrophilic Ointment, those containing 36 to 40% of water present a greater stability to heat tests than those of a larger percentage. This amount of water is sufficient to produce an oil-in-water emulsion, which possesses pharmaceutical elegance.

Our studies have demonstrated the advisability of including a petrolatum phase, first for its softening effect upon the residual film of ointment as applied to the skin, second for the smoothness and "slip" which it adds to the finished product, and last but of equal importance many dermatologists are of the opinion that all ointments should contain some petrolatum. That the amount of petrolatum contained in Hydrophilic Ointment does not interfere with the release of medicinal agents was proved through the tests by the agar plate method.

Using *Staphylococcus aureus* as the test organism, a phenol ointment prepared with this hydrophilic base exhibited a zone of inhibition of 6 to 7 mm. Another test to determine the bacteriostatic properties of ointments prepared

* Professor of pharmacy, State University of Iowa College of Pharmacy and member of the U. S. P. Revision Committee and the Subcommittee on Ointments.

with this base was made by the same method using penicillin sodium, 1000 units per gram. Tested when freshly prepared, penicillin ointment produced a zone of inhibition of 26 to 27 mm.

The base was also tried in the preparation of the following ointments:

MEDICATION	PER CENT
Ammoniated mercury	5
Ammoniated mercury 5% and salicylic acid	2.5
Belladonna	10
Boric acid	10
Chrysarobin	6
Ethyl aminobenzoate	5
Ichthymmol	10
Penicillin sodium	1 M units per Gm.
Phenol	2
Sulfur	15
Tannic acid	20
Whitfield's combination	½ strength
Zinc oxide	20

All ointments were of good consistency, spread well, and after application to the skin all could readily be removed with the aid of water.

It is recommended that Hydrophilic Ointment, like other water-containing creams, be freshly prepared by the pharmacist or stocked only in such quantities as can be used in a reasonable length of time. Containers with tight closures should be utilized for prescriptions employing Hydrophilic Ointment as a base. Tubes are especially recommended.

Hydrophilic Ointment is not recommended as a base for ophthalmic ointments because it may prove irritating to mucous membranes. The late Dr. Herbert O. Calvery of the Food and Drug Administration, reporting on this ointment (Bulletin 23 of the U. S. P. Subcommittee on Ointments, page 50), stated that they have no record of sensitization from any of the ingredients contained in this base and that they have a sufficiently low systemic toxicity so that this is not a problem.

Clinical use of penicillin ointment made from this base, in the University of Iowa Hospitals and the Department of Student Health, has to date failed to reveal any irritating properties or contact dermatitis. Use of this base as a vehicle for application of medicinal substances to the scalp has likewise proved effective and without reaction to the base. Whitfield's combination reduced to half strength, when used in intertrigenous areas, has been found to be very effective. It is suggested that in cases where salicylic acid and/or benzoic acid are indicated the concentration could still be reduced further. Clinical results are not complete and have not progressed sufficiently far to permit definite commitment on this point.

Hydrophilic Ointment should furnish the pharmacists and physicians with a vehicle which can be used with the majority of substances most frequently prescribed for external application. It is a product which will supply the pharmacist with a base capable of answering the call for an emulsified, washable, or hydrophilic base.

WATER-ABSORPTION OINTMENT BASE PROPOSED FOR INCLUSION IN U.S.P.

A water-absorption type of ointment base has been proposed for inclusion in U. S. P. XIII under the title "Hydrophilic Petrolatum." Available commercially for some time, the base has been well received by both clinicians and pharmacists. It is anhydrous but mixes with water or most aqueous solutions.

The formula is as follows:

Cholesterol	10 Gm.
Stearyl alcohol	30 Gm.
White wax	80 Gm.
Wool fat, anhydrous	150 Gm.
White petrolatum	730 Gm.
To make	1000 Gm.

Melt the ingredients together on a water bath, mix thoroughly, remove from the water bath, and stir until the mixture congeals.

A.PH.A. REPRESENTED ON ADVISORY GROUP FOR SURPLUS PROPERTY

Dr. Robert P. Fischelis, secretary of the AMERICAN PHARMACEUTICAL ASSOCIATION, has accepted the invitation of Administrator Watson B. Miller of the Federal Security Agency to serve on the advisory committee concerning the disposal of surplus property for health protection use.

The committee, headed by Surgeon General Parran of the U. S. Public Health Service, will advise the Federal Security Agency, and ultimately the Surplus Property Board, on problems and policies related to the disposal of surplus medical supplies, equipment and material suitable for use in the protection of public health.

CAMPHOR BASIL

NATURAL camphor from an American farm crop may eventually be available to pharmacists as a result of experiments being conducted at the U. S. Department of Agriculture's Bureau of Plant Industry. This prospective source is camphor basil (*Ocimum kilimandscharicum*), a perennial undershrub native to Kenya, Africa.

At the Bureau's Beltsville (Md.) station and in Virginia, the plant has been grown experimentally for the past eight years. A worker is shown in the photograph (*upper left*) recording the harvest yield from a test plot. After harvesting and drying, distillation of the plants yields a mixture of camphor and oil (*center illustration*). When cool the semisolid mixture is centrifuged to separate the snow-white granular camphor. Pressed cakes of the purified product (*as shown below*) have physical and chemical properties which agree closely with those of commercial natural camphor.

On the basis of work to date, M. S. Lowman and J. W. Kelly, who have supervised the project, state that it "has possibilities as a domestic source of natural camphor and the cost of handling the crop in the south as a perennial should not be greater than that of mint in the mint-producing sections of Michigan and Indiana."

Results of test plantings in a number of southern states this past season are now being compiled to determine just where camphor basil can best be grown. Based on an average yield

of 100 pounds per acre, 10,000 to 20,000 acres would need to be planted by American farmers to replace the amount imported from Japan before the war.

It is not yet known whether the product from camphor basil could compete with synthetic camphor. This will depend to some extent on possible industrial uses of the residue oil obtained as a by-product. Other experiments are under way to isolate a strain of this basil species which would raise the average yield.

BENTONITE SUSPENDING PROPERTY DUE TO LATTICE-LIKE CRYSTAL

The superior suspending properties of bentonite, as compared with fuller's earth or kaolin, are due to its singular lattice-like crystalline structure more than to particle size, according to physical and chemical data reported by Prof. Henry M. Burlage and Joseph La Rocca of the University of North Carolina School of Pharmacy (THIS JOURNAL, *Scientific Edition, 34:* 302, 1945). Mr. La Rocca is an AMERICAN PHARMACEUTICAL ASSOCIATION research fellow.

Stability of clay suspensions was found to be markedly affected by the *p*H of the outer phase. This is particularly true of bentonite, which is more stable in neutral and alkaline mediums than in acid mediums.

When bentonite is washed with acid its suspending properties are lost because the acid neutralizes the surface hydroxyl ions, thus preventing formation of large, stable, linear aggregates.

SECRETARY FISCHELIS TESTIFIES ON RESEARCH AT SENATE HEARING

At Senate hearings October 22, on the proposed national research foundation, Dr. Robert P. Fischelis, A. PH. A. secretary, testified as one of a panel of health authorities, which included Dr. Morris Fishbein of the American Medical Association, Dr. Allan Butler of the Massachusetts General Hospital and Dr. E. M. MacEwen, dean of the College of Medicine at the State University of Iowa. Held jointly by a subcommittee of the Senate Commerce Committee and the Military Affairs Committee, the hearings will form a basis for action on five bills now before Congress.

As evidence of what coordinated effort can accomplish in the scientific field, Dr. Fischelis cited the swift development and evaluation of penicillin during the war, contrasting it with the many years often needed to make new drugs generally available, such as in the case of insulin.

In view of this wartime record, Dr. Fischelis voiced the opinion that the need for coordinated research in the field of health and medical science has been well demonstrated.

As to the coordinating procedure, he stated that "it is my belief that a research foundation, such as is contemplated in the legislation you are considering, can furnish the necessary coordinating factors and stimulate activity in the directions which will be most effective for the national health and welfare."

Although the pending bills (S. 1297, 1285, 1248 and 825 and H. R. 3440) vary in detail, all of them provide for some type of national science foundation. Especial emphasis is placed on coordination of research among the various government agencies and promotion of research elsewhere to develop more rapidly the fruits of research for national defense and in medical and other scientific fields. S. 1297 and S. 1285 would also authorize grants for fellowships and scholarships in the sciences.

RUBBING ALCOHOL CONTROL LIFTED

Ethyl rubbing alcohol may now be dispensed over the counter. W. P. B.'s wartime prescription requirement was revoked October 29 through amendment to Schedule 71 of M-300. Bureau of Internal Revenue regulation No. 3 still applies. This requires that ethyl rubbing alcohol be dispensed only by a licensed pharmacist and that his name and the address of his pharmacy must be conspicuously stamped or written on the label at the time the product is dispensed.

INDIANAPOLIS PHARMACY COLLEGE MERGES WITH BUTLER UNIVERSITY

The Indianapolis College of Pharmacy has merged with Butler University. To be known as Butler University College of Pharmacy, the school will move to the Butler campus as soon as a building for it can be constructed.

Dr. E. H. Niles, dean since 1921, and other faculty members will continue to serve in their present capacities, according to an announcement from the A. PH. A. student branch at the Indianapolis College.

U. S. PHARMACISTS MEET ON SAMAR

The following account is condensed from a report, just received from the Philippines, on a meeting of U. S. pharmacists stationed on Samar.—THE EDITOR

ASSEMBLING the pharmacists attached to the U. S. Fleet Hospital 114 in the Philippines was much like a miniature national convention. This outpost hospital has an array of 23 pharmacists representing 22 states in so far as licensure is concerned. Seven of the men hold dual or triple registrations. The names and home communities of the pharmacists are listed in the caption of the accompanying "convention" photograph.

While only 6 of the men are needed to operate the hospital's pharmacy on Samar, the others are engaged in various duties as Navy pharmacist mates. Some of the places where these other pharmacists are on duty are the surgical and medical wards; dermatology, sanitation, genito-urinary and laboratory departments; medical records; evacuation pool and special diets.

All of the pharmacists were in some phase of the liberation of the Philippines. Many of them have seen battle action at Wewak and Wadke (New Guinea); Borneo (Dutch East Indies); Leyte, Luzon, Panay, Negros, Mindanao and Samar (Philippines); Vella Lavella, Guadalcanal and Bougainville (Solomons Isles); and Guam (Marianas).

Most of these pharmacists were engaged in retail pharmacy prior to entry into service. In general, they expressed plans to return to the same pharmacies in which they were employed before the war.

At the assembly of these island pharmacists they were all asked: "What, in your own opinion, could or should be done for pharmacy?"

The general sentiment was for more national cooperation, stronger state organizations, shorter working hours, better wages, and a sincere desire to see the average drugstore change back to its

NAVY PHARMACISTS ON SAMAR IN THE PHILIPPINES assembled for a meeting at the pharmacy of Fleet Hospital 114: (l. to r.) lst row: Robert G. Krewinghaus, Godfrey, Ill.; Bernard Rosen, Brooklyn, N. Y.; Leo J. Babin, New Orleans, La.; Harry Kimmelman, Atlantic City, N. J.; Edward J. Flasted, Baker Mont.; Gerald C. Sparks, Hialeah, Fla.; Ira L. Adams, Moultrie, Ga.; Henry J. Cook, Madison, Wis.; Daniel H. Wolfe, Chicago, Ill.; 2nd row: Jack W. Tiernan, Brown Field, Tex.; Amos N. Mattison, Atlanta, Ga.; Dorsey R. Mussell, Clare, Mich.; Mansfield H. Smith, San Diego, Calif.; Bernard V. Schoeningh, Santa Rosa, Calif.; Ben Raboy, Brooklyn, N. Y.; Fred P. Goodenough, Falfurrias, Tex.; Pleasant J. Pruitt, Prescott, Kan.; Irvin E. Larson, Saco, Mont.; Cary O. Anderson, Washington, D. C.; 3rd row: Richard H. Lund, Algona, Ia.; Eugene C. Kuske, Sleepyeye, Minn.; Clare W. Gove, Athol, Mass., and James N. Reilly, Long Island City, N. Y.

oldtime atmosphere of greater professionalism.

Some replies also bear on future intentions of the men themselves and what organizations and schools might do to help them and other pharmacists. Here are typical comments:

"We have local, state and national associations that all who are in the profession of pharmacy should be members of, and do everything possible . . . "

"We should have but one national association but make it a good one."

"The average pharmacist isn't sufficiently ethical."

"Refresher courses of colleges should definitely include some subjects to enable them [returning veterans] to specialize in some phase of pharmacy . . . . The GI bill allows us twelve full months and such a time reviewing practically the same old subjects would seem quite a waste of time as well as boring to many vets."

"Fair trade laws should be rigidly enforced."

"Every manufacturer should establish a fair trade price for his product that would insure a fair profit."

With hostilities in the Pacific ended, the pharmacists expressed the usual desire to get back home and back to pharmacy. At least half of them hoped to eat Christmas dinner at home. For at least 6 of these it would be their first Christmas at home in over three years.

THIRD ANNUAL A.PH.A.—N.A.R.D. JOINT MEETING

THE AMERICAN PHARMACEUTICAL ASSOCIATION was host to the executive committee of the National Association of Retail Druggists on November 9 in Washington, D. C., when the executive groups of the two national organizations met for their third annual joint conference. Dr. George D. Beal of the A. PH. A. presided, with Frank Moudry of N. A. R. D. serving as co-chairman.

Many important professional and economic phases of pharmacy were covered in resolutions and discussions during the day's sessions. The extensive agenda was based on current problems revealed in resolutions adopted during the year by local, state and national pharmaceutical organizations.

All resolutions appear in full on page 372; below are summarized some of the conference highlights.

After discussing how best to be of assistance to pharmacist-veterans in their professional problems, the joint conference instructed the A. PH. A. secretary and N. A. R. D. Washington representative to proffer the cooperation of the profession to the Veterans' Administration. It was agreed that this could best be accomplished through establishment of state advisory committees to the Veterans' Administration, and state pharmaceutical associations were urged to set up suitable committees similar to those which served in an advisory capacity to Selective Service during the war.

During the discussion of problems in prescription practice, it became apparent that there is a real need for promoting more uniform observance of approved practices in the writing and handling of prescriptions. The Council on Professional Relations was therefore requested to prepare and distribute through the state associations a Manual of Procedure governing the relations between physicians and pharmacists in all phases of prescription practice. The state associations will be encouraged to disseminate this material to the medical profession.

Turning to consideration of the status of pharmacists in government service, both A. PH. A. and N. A. R. D. representatives expressed vigorous opposition to efforts of the Civil Service Commission to recruit pharmacists who do not meet the legal standards of education and training for licensure in 45 of the 48 states. The conference requested the Civil Service Commission to withdraw immediately Announcement 404 of October 24, 1945, pointing out that the policy expressed therein is inimical to the public interest and prejudicial to the professional standing of pharmacy.

In another move to safeguard the standards of the profession, the conference went on record urging that every effort be made to prevent the enactment of legislation which would break down established requirements for education and licensure under the guise of providing assistance to war veterans.

The conference later received a report on the barbiturate conference which had been called by the A. PH. A. legislative committee, which is representative of both associations, following a survey of the problem growing out of the misuse of these drugs. Commending the committee for its work, the conference supported its efforts

toward formulating a uniform state law for control and distribution of barbiturates and other hypnotic drugs. It was the consensus that the type of control represented by the Harrison Narcotic Act should not be approved at this time.

One of the important resolutions concerning the business side of retail pharmacy urged Congress to create a government agency or department for the sole purpose of developing small business.

Graduate Students Needed

The conference took cognizance of the need for a greatly increased number of graduate students in pharmaceutical and allied subjects, strongly urging the American Foundation for Pharmaceutical Education to plan for making at least $75,000 available annually for graduate fellowships. In regard to recruitment of undergraduate students, the conference asked that colleges of pharmacy place emphasis on scholastic preparation and aptitude rather than on numbers.

Action was also taken on H. R. 4225, now before Congress, which provides appointment of a group of pharmacy officers in the proposed department of medicine and surgery in the Veterans' Administration. While approving the appointment of such commissioned pharmacy officers, the conference urged amendment of the bill to create a separate pharmacy corps and to make the appointment of a chief pharmacist mandatory rather than permissive.

A less satisfactory situation in regard to pharmacists in government service was critically analyzed in connection with the Pharmacy Corps, and the joint conference went on record demanding full recognition by the Surgeon General of the intent of Congress expressed in the Pharmacy Corps Act.

To provide more effective public relations for the profession, the conference asked that committees be set up in each state pharmaceutical association to establish and promote public relations programs based upon the retail pharmacy as a focal point in pharmacists' contacts with the public.

In the field of professional relations, the A. PH. A. and N. A. R. D. executive groups urged closer cooperation between public health agencies and medicine, dentistry, pharmacy nursing and hospital activities. Establishment of state allied health councils was recommended as a contribution toward this end.

Several resolutions were adopted involving the economic problems of retail pharmacy. The Patman Collective Bargaining Bill was endorsed and approved, which would remove the obstruction in anti-trust laws preventing collective buying and bargaining by retailers. Support was given to the continuation of whatever price control is necessary to check inflation, but with safeguards against "squeezes" from cost absorption and with provision for protection of the fair trade structure. It was asked that control over commercial rents be authorized in any extension of the price control act. Congress was also urged to discontinue the excise tax on cosmetics, toilet articles and other arbitrarily selected commodities. After discussion of surplus property, the joint conference resolved that small business be protected against speculators in surplus stocks by permitting original manufacturers to repurchase their trademarked products for normal distribution, subject only to government priorities.

The conference reaffirmed its position concerning changing concepts of medical care by agreeing to cooperate with any adequate plan to extend medical care which utilizes existing medical facilities and guarantees the right of free choice of pharmacists, physicians, dentists or other medical practitioners. Any attempt to regiment pharmaceutical or medical services or to place their practice under political or autocratic control was opposed.

Participants in Conference

N. A. R. D. was represented at the meeting by President J. Otto Kohl, Cincinnati, O.; Secretary John W. Dargavel, Chicago, Ill.; Frank W. Moudry, St. Paul, Minn.; William McConaghy, Pittsburgh, Pa.; John B. Tripeny, Casper, Wyo.; P. J. Suttlemyre, Hickory, N. C.; Charles Gilson, Centreville, R. I.; James W. Lyons, Detroit, Mich.; George H. Frates, Washington, D. C.; Theodore Christianson, Chicago, Ill.; and Herman S. Waller, Chicago, Ill.

A. PH. A. representatives were President George A. Moulton, Peterborough, N. H.; Secretary Robert P. Fischelis, Washington, D. C.; George D. Beal, Pittsburgh, Pa.; S. H. Dretzka, Milwaukee, Wis.; Henry H. Gregg, Minneapolis, Minn.; H. H. Schaefer, Brooklyn, N. Y.; Ernest Little, Newark, N. J.; Robert L. Swain, New York, N. Y.; Roy B. Cook, Charlestown, W. Va.; Charles E. Wilson, Corinth, Miss.; P. H. Costello, Chicago, Ill.; Charles H. Evans, Warrenton, Ga.; Glenn Sonnedecker, Washington, D. C.; and E. R. Serles, Chicago, Ill.

The Council of the AMERICAN PHARMACEUTICAL ASSOCIATION entertained the N. A. R. D. Executive Committee at luncheon at the Statler Hotel on the day of the meeting.

RESOLUTIONS OF JOINT CONFERENCE

LEGISLATIVE PROBLEMS

RESOLVED that the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, endorse and approve the *Patman Collective Bargaining Bill** in order to remove the obstruction in the anti-trust laws which prevents collective buying and bargaining on the part of retailers.

RESOLVED that the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, urge the Congress and our Chief Executive to create an agency or department within the Executive branch of government devoted exclusively to the *development of small business;* that this agency be directed and empowered to make studies of small business and recommendations to the Congress on all phases of industry and commerce; and be it further

Resolved, that this agency or department be headed and staffed by qualified personnel, equipped by experience and training in the management of small business activities in the fields of distribution and production.

RESOLVED that the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, urge Congress to discontinue the *excise tax* on cosmetics, toilet articles and other arbitrarily selected commodities, and to replace such tax, if necessary for revenue purposes, with a tax at the source.

RESOLVED by the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, that any attempt through legislation or regulation, to regiment pharmaceutical or medical services, or to place their practice under political or autocratic control be opposed; and be it further

Resolved that they will cooperate with any adequate plan to extend *medical care* which utilizes existing medical facilities and which guarantees the right of free choice of pharmacist, dentist, nurse, physician, or other medical practitioners.

RESOLVED that the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, demand full recognition by the Surgeon General of the intent of Congress expressed in the *Pharmacy Corps* Act, and direct that a copy of this resolution be sent to the Military Affairs Committees of the House and Senate,

RESOLVED that the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, take cognizance of the provision for the appointment of a group of pharmacy officers in the proposed department of medicine and surgery in the *Veterans' Administration* as provided for in H. R. 4225, and while approving the appointment of such commissioned pharmacy officers urge the amendment of this bill so that it will create a separate pharmacy corps instead of grouping pharmacists in the auxiliary corps; and be it further

Resolved that Section 3 (f) of H. R. 4225 be amended to make the appointment of a chief pharmacist mandatory rather than permissive; and be it further

Resolved that H. R. 4225 with these amendments is hereby endorsed.

RESOLVED that the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, support the continuation of that kind and degree of *price control* necessary to check inflation but with safeguards against "squeezes" resulting from cost absorption and provision for the protection of the fair trade structure; and that control over commercial rents be authorized in any extension of the emergency price control act.

RESOLVED by the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, that small business be protected against speculators in government *surplus stocks* by permitting original manufacturers to repurchase their trademarked products for normal distribution subject only to government priorities.

RESOLVED that the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, recognize the right of consumers to organize and operate *cooperative stores* with the same privileges and immunities enjoyed by other business; but oppose any government favoritism such as income tax exemption and government loans at interest rates lower than those which other businesses pay in the regular money market.

PUBLIC RELATIONS

RESOLVED by the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, that public relations committees be set up in each state pharmaceutical association so that *public relations programs* may be established and promoted which will be based upon the retail pharmacy as a focal point in pharmacists' contacts with the public.

RESOLVED by the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, that pharmacists be urged to identify themselves with community health, educational, cultural and other *civic activities* as a contribution of pharmacy to community betterment.

RESOLVED by the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, that state pharmaceutical associations be urged to create suitable committees to act in an advisory capacity to the *Veterans' Administration* with respect to problems affecting returning pharmacist-veterans and that Dr. Robert P. Fischelis, secretary of the AMERICAN PHARMACEUTICAL ASSOCIATION, and George Frates, Washington representative of the N. A. R. D., be instructed to confer with General Omar Bradley, director of the Veterans' Administration, to offer the cooperation of the profession through such committees.

* Italics in resolutions have no significance except to provide quick reference to actions taken on specific subjects.

RESOLVED by the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, that the resources of the pharmaceutical profession and industry be pledged to support the *Victory Loan Drive.*

EDUCATION AND STANDARDS

RESOLVED by the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, that in the *recruitment of students* for colleges of pharmacy emphasis be placed on scholastic preparation and aptitude rather than on numbers.

RESOLVED that the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, urge state pharmaceutical associations to continue their support for adequate state *financial aid to colleges* of pharmacy.

RESOLVED that the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, take cognizance of the need for a greatly increased number of *graduate students* in pharmaceutical and allied subjects and strongly urge the American Foundation for Pharmaceutical Education to plan for making at least $75,000 available annually for graduate fellowships.

RESOLVED by the Council of the A. PH. A. and the Executive Committee of the N.A.R.D., in joint assembly, that they express the belief that the inauguration of a *five-year course in pharmacy* should be deferred until the need can be more definitely shown and until the opportunities open to pharmacists more clearly justify such an extension of the course; and be it further

Resolved that the colleges of pharmacy be urged to critically examine the present curriculum for the purpose of deleting obsolete material so that more time can be given to courses necessary to an understanding of modern therapeutic agents and so that the curriculum will be more suited to the needs of modern pharmacy as it reflects current medical practice.

RESOLVED that the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, express their vigorous opposition to the efforts of the *U. S. Civil Service Commission* in recruiting pharmacists for the government service who do not meet the recognized standards of education and training required by law in 45 of the 48 states and request immediate withdrawal of Announcement No. 404, dated October 24, 1945, on the grounds that the policy expressed therein is inimical to the public interest and prejudicial to the professional standing of pharmacy.

RESOLVED that the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, endorse the program of distributive education authorized under the George-Deen Act and that state pharmaceutical associations, in cooperation with colleges of pharmacy, be urged to sponsor *refresher courses* suited to the needs of returning pharmacist-veterans and practicing pharmacists in general.

RESOLVED that the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, urge that *hospital drug rooms and pharmacies* be operated under the sole supervision of registered pharmacists, and that legislation, where necessary, be sought in each state to achieve this end.

RESOLVED that the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, urge that every effort be made to prevent the enactment of legislation which seeks to break down established *standards of education and licensure* under the guise of providing assistance to war veterans.

RESOLVED by the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, that approval is hereby given to the principle of using federal funds, through the agency of a *National Scientific Foundation*, to promote scientific research in the United States; and be it further

Resolved that there be assured the maximum amount of freedom and the minimum amount of governmental supervision, compatible with the proper use of federal funds, in administering the research programs in the various institutions entering into such research agreements.

INTERPROFESSIONAL AND PROFESSIONAL PROBLEMS

RESOLVED that the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, urge closer cooperation between public health agencies and the professions engaged in medicine, dentistry, pharmacy, nursing and hospital activity, and recommend that state *allied health councils* be created in the various states as a contribution toward this end.

RESOLVED that the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, commend the legislative committee, which is representative of both associations, for its constructive study of the *barbiturate* problem and for its efforts looking to the formulation of a uniform state law for the control and distribution of barbiturates and other hypnotic drugs.

RESOLVED by the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, that the Council on Professional Relations be requested to prepare and distribute to state associations a *manual of procedure* governing the relations between physicians and pharmacists in all phases of prescription practice.

RESOLVED that the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, strongly condemn the efforts of any group, agency, association or other organization which seeks to withdraw from *boards of pharmacy* the necessary authority to regulate the distribution of drugs, medicines and health supplies.

RESOLVED by the Council of the A. PH. A. and the Executive Committee of the N. A. R. D., in joint assembly, that every lawful means be sought to protect the public health by *limiting the dispensing* of drugs and medicines, including vitamins in various dosage forms, to registered pharmacists.

I AM glad to take this opportunity to cordially invite you to become an active member in the AMERICAN PHARMACEUTICAL ASSOCIATION. After thirty years' experience behind the prescription counter I have the firm conviction that, for the retail pharmacist, an A. PH. A. membership pays dividends far beyond the dues invested. It offers the principal hope of maintaining pharmacy in its rightful place among the professions.

Wartime conditions have emphasized an important fact: There is real satisfaction and opportunity in developing the pharmaceutical services of the retail pharmacy. With the rapid development of modern medical care we, in our pharmacies, require professional information and services to keep pace with progress. As we face new problems we realize they can be solved only by organized effort. The A. PH. A. is prepared to provide the necessary leadership, services and information through the most comprehensive program of its ninety-three years of endeavor. Through its House of Delegates the way is opened for a united leadership representative of every subdivision of the profession and drug industry.

I hope you will sign the application blank below and mail it at once. Help make sure the success of the postwar program the A. PH. A. has begun. Please accompany your application with any suggestions which may help us to serve your interests better.

George J. Maratta

President.

APPLICATION FOR MEMBERSHIP

American Pharmaceutical Association

Approving of its objectives, I hereby apply for active membership in the American Pharmaceutical Association and subscribe to the "Journal of the American Pharmaceutical Association." Enclosed is $_____ for membership dues with subscription to the ☐ Practical Pharmacy Edition at $5; ☐ Scientific Edition at $6; ☐ Both Editions at $7.

Name in Full_____

Number and Street_____

Town_____ **State**_____

Graduate of_____ **Year**_____ **Degrees**_____

I am a registered pharmacist in _____ and am engaged or, in the case of retirement, was engaged as: __ Retailer, __ Wholesaler, __ Manufacturer, __ Drug Importer, __ Teacher, School Official or Librarian, __ Research Worker, __ Editor, __ Publisher, __ Representative, __ Pharmaceutical Chemist, __ Food and Drug Official, __ Hospital Pharmacist, __ Association Official, __ Pharmacist in Government Service, __ Student.

The applicant named above is recommended by the undersigned two members:

Name_____ **Name**_____

If the applicant is unacquainted with any member of the Association, the officers will aid in securing the necessary recommendations. This application, with the payment of dues for one year, may be sent to any member of the membership committee, the Secretary, or any officer of the Association. *P12-45*

Date_____ **R. P. FISCHELIS,** *Secretary,* **2215 Constitution Avenue, Washington 7, D. C.**

SERVICE SELLING IN PHARMACY

by J. W. SNOWDEN

WHAT'S BEYOND THE DOOR OF TOMORROW'S PHARMACY? WRITER SUGGESTS MORE PROFESSIONAL OPERATIONS WHICH CAN BRING BOTH PRESTIGE AND SUCCESS

THERE has come at last general recognition in pharmacy of the need for improving public relations. To anyone who has made a serious study of the problems that harass the pharmacist it is only too apparent that he encounters most of them largely because so many persons with whom he has to deal are not sold on pharmacy as a vital health profession. There would be fewer uncooperative physicians, fewer price-minded prescription shoppers among the physician's patients, less lack of consideration from lawmakers and prospective pharmacy students if more of the individuals who comprise these groups fully appreciated the service of pharmacy in the process of scientific medication.

To depend too greatly upon a formal public relations campaign to reverse public opinion would be, however, a rather serious error. In the final analysis people will come to hold pharmacy and any pharmacist in higher regard only through the same processes that caused them to hold a lesser opinion of it or of him.

Before they can be brought to accept a higher evaluation of the pharmacist as a public health guardian and servant, the pharmacist himself must make it apparent by his operations policy, his pharmacy, and his attitude that claims of such service have a foundation in truth. As much as anything else, improving the public relations of any one pharmacy is a matter of improving operations standards and the visibility of such standards.

All of us are realists enough to know that we are not going to get better drugstores merely by complaining that the average drugstore operation is detrimental to the prestige of the profession. Is anyone, for instance, naive enough to believe that we are seeing the rapid expansion in the number of prescription shops going into the larger towns and cities—shops that are doing yeoman service in creating greater respect there for the profession of pharmacy—merely because the sponsors of these new shops felt that too great a preoccupation with moving merchandise and building soda volume was damaging to pharmacy's public relations? True, there was doubtless recognition of that damage. But we are much more likely to believe that the principal motivating force was their belief that they could make as much or more money with a professional operation than they could with a more general setup.

Let's get down to the facts. In our economic system, one that has never been paralleled for its ability to get things accomplished, the prime mover is profits. We shall get enough better drugstores to raise public impression of the profession most readily if it becomes evident to enough pharmacists that a more desirable type of operation from a public relations standpoint is also more desirable to them from a profits standpoint.

Here, it seems to me, is our cue for a new facet to pharmacy's general promotional efforts—a panel of the campaign to be directed back onto pharmacists themselves. The substance of this subcampaign would consist of publicizing the

---

Presented to the Section on Practical Pharmacy, AMERICAN PHARMACEUTICAL ASSOCIATION, Cleveland meeting, 1944.

size of the market that exists for professional services and products. Not alone in the larger population centers, for in the smaller communities it could be considered feasible to sponsor a professional operation. This promotion to pharmacists would set forth the greater opportunities for profit through reduced overhead expenditures, the greater immunity against the bigger, the more avid type of merchandising competition which is undoubtedly coming, the greater prestige and standing in the community and the better working conditions that are possible through that type of operation that has the best chance of getting the biggest portion of the available professional practice.

Exclusive Shop Not Required

Nor is it necessary that a pharmacy be an exclusive prescription shop to maintain pharmacy's prestige at a desirable level. It is only necessary that it should be chiefly devoted to serving the health and hygiene and chemical and allied needs of the people in its community and that it should *look like* that were its chief occupation. What a stride forward we shall have made if we can inspire this more general type of professional operation in just one more drugstore in every average-size community!

It is not necessary that all drugstores abandon the commercial type of operation, no more than every physician is required to be a model of medical excellence in order to uphold the prestige of medicine. If the average community has one good pharmacy, as well as one good physician, it is their inferiors who will suffer by comparison more than the professions will suffer because of the inferiors.

It is well that total conversion from commercial to the professional type of operation is not necessary to the increased prestige of pharmacy, for the present market for professional services is not of itself large enough to support all 53,000 of our retail pharmacies. According to available statistics there are approximately 650 families for every pharmacy and they will, on the average, obtain from all sources $43,980 worth of supplies that can be honestly promoted under the banner of community health service.

To figure on a professional volume of some consequence, therefore, it will be more in line to consider a community of twice 650 families, figuring that the other drugstore there will concentrate on the soda, luncheon, tobacco and general merchandise business while our professional pharmacy makes its bid for the $87,960 worth of professional purchases from the entire 1300 families. This figure is a somewhat conservative estimate, at least for any community of average cultural standards and buying power.*

I shall explain why I am so sure that the pharmacist who gears himself to go after the professional volume in his community will get at least half of it, even in competition with another pharmacist, with department stores, superstores, grocery stores, mail order houses, house-to-house canvassers and any new form of general merchandise distribution we can foresee at this time.

Time and again it has been proved that where the general distributor has but one general selling force, the force of general sales promotion, the pharmacist has two: the force of general sales promotion *and* the force of technical knowledge.

Let us not overlook the fact that the highest paid salesman in our economic system is the technical salesman, the salesman whose knowledge attracts trade and not his prices. A druggist whose establishment is part soda parlor, part restaurant, part hardware store and electrical shop and part a lot of other things foreign to a health and hygiene service, has lost the selling force of the technical salesman whose symbol, as far as public recognition is concerned, is specialization. By taking on lines purely on their potentialities for selling from display he has placed himself directly in competition with the really big practitioners of mass distribution and has lost, at the same time, the appeal and power of specialization in his own legitimate field. In the scramble for merchandising volume for which these big competitors are squaring off even now, it is only the unusual merchandising druggist who will be able to finish in the money.

Specialize in Your Speciality

Certainly the safest position in the postwar distribution picture for an individual with technical training is in that field for which he received his specialized training. True, it may be a much smaller field in comparison. But instead of casting about for just any kind of merchandise that will move of its own accord, he will spend his time devising the most effective ways of distributing those things that are natural to his profession. He will specialize, and specialization in itself will get him favorable publicity, will naturally lead patrons to him.

His will be *service* selling as opposed to *surface* selling. In addition to providing him

---

* Based on figures supplied by the Curtis Publishing Co., *The Farm Journal*, and a corroborative survey by Pictorial Paper Package Corp.

DOCTRINE OF THE COMMUNITY HEALTH SERVICE SHOP

It is my professional duty, therefore my obligation, to the people of my community to make available to them the finest and most advanced products of medical science to safeguard their lives or bring them comfort in time of sickness; to bring to them the laboratory products they need for the care and grooming of their persons, and the chemical products that will solve their manifold problems of household hygiene. It is my duty to keep abreast of the new developments in all phases of this health and hygiene project and to disseminate information about them either to the people themselves or to their physicians, or both, as each case may demand.

I cherish my status as a professional man and the naturally greater acceptance it gives me over the lay merchant as a distributor of products related to health, personal or household hygiene, and products of a direct chemical association. I shall endeavor, therefore, perpetually to resist encroachment of purely commercial and unsympathetic activities that may dissipate my reputation as a technically educated specialist, and shall devote the time and space thus gained to the expansion of those services which fall within the fabric of my professed sphere of specialization.

with the greatest immunity to mass merchandising tactics it will raise him several notches in public esteem, automatically improve his standing with physicians, afford him more satisfaction in his work and, by instituting a professional atmosphere, will vastly improve the working conditions in his establishment.

The first prerequisite for this mightily-to-be desired condition is an improved selling policy based upon a clear-cut concept of specialized service. The pharmacist must imbue himself with the idea that his establishment will become the health service center of his community; he must conceive it as his special mission to bring to his people the best that pharmaceutical science has to offer for safeguarding their lives and bringing them comfort in times of sickness. He must be alert also to their requirements for personal hygiene and grooming and to their manifold household chemical needs. Let him, moreover, consider it his obligation to the people in his community to keep them or their physicians, or both, constantly informed of the newest developments in each branch of his service.

Here, in this concept, is a call to service high enough to gratify the best that is in any man with the training required to answer it. Here also is service that will consume all the time that man can find. But freed from the harassments of a multiplicity of side lines, he will have the time to give and, in giving it, will receive the rewards that result from the exercise of the 3 M's of successful professional operation: Management, Manufacturing, and Merchandising.

As this is a paper on professional or service "selling" there is no necessity of dwelling here on the many ramifications of either thoughtful, painstaking Management or of Manufacturing. Except it may be in order to remind those who have been busy with commercial interests that manufacturing some of their own pharmaceuticals can bring extra savings for the patient, extra prestige in the eyes of the physician, and extra remuneration for the pharmacist in so doing. In the professional pharmacy, merchandising (as we may call it for want of a better term) deserves special comment, however, for it involves not only an improved selling plan but an improved selling plant.

In the first place there is the general promotion of the establishment itself as the headquarters for prescriptions, sickroom supplies and allied health items. As this is best done by suggestion rather than by direct appeal, any advertising employed should take the form of selling the idea of professional service in sickness or of short discussions on vital new drugs (drugs available on prescription only). Talks before service clubs or other local groups is excellent general promotion. The most effective promotion of all, however, is the appearance of the pharmacy itself, and what you stock is as important a factor as the quality of fixtures you use to dispense it from.

Better Departmentalization

This brings us to the subject of departmentalization. Because it is an eminently effective way of getting home the idea that you are headquarters for the classifications of products departmentalized, it is taken for granted that departmentalization will become an established practice. *How* you departmentalize, however, means as much to the community health service type of pharmacy as whether or not you do.

To make it mean something the pharmacy should show it structurally, but of equal impor-

tance is what we shall call the principle of apt nomenclature. Departmental signs, if confined to words with a health, a hygiene or a chemical association, augment the impression of specialization in service pertaining to health, hygiene and chemicals. Consider, for example, the cosmetics and toiletries department which the department store, the merchandising drugstore, the super-store and the mail order house also have.

The operator of a community health service type of pharmacy can emphasize his general promotional theme by naming this classification in his pharmacy the Personal Hygiene and Grooming Department. Instead of a vitamin department, also possessed by most of his competitors, let him name his the Dietary Supplements Department, which suggests at once more knowledge of the end use of vitamin products and a source of other dietetic supplies. A more significant name for the proprietary or patent medicine department, and one which will not rub the physician the wrong way every time he walks into the pharmacy, would be to call it the Household Chemicals and Remedies Department.

Note the power of the following list of department names for impressing upon one that the establishment is really a health service center:

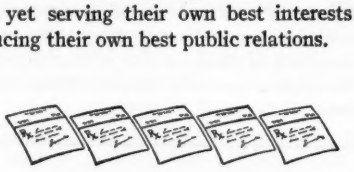
Personal Hygiene and Grooming
Baby Department
Feminine Hygiene
Surgical Appliances
Prescription Department
Sick Room Supplies
Dietary Supplements
Household Chemicals and Remedies
Photographic Supplies and Stationery

Only one, Photographic Supplies and Stationery, does not carry the health, hygiene or chemical service connotation, but because it has wide acceptance in pharmacies and is not of a cheap character, it need not, if handled with a sense of proportion, detract from the dignity of the operation as a whole. This can also be said of candy, tobacco and magazines when these items are displayed with moderation that suggests they are handled more as a service than as volume builders.

Let us envision such a retail pharmacy operation in a minimum community of 1300 families. I see it as an attractive, orderly establishment with a congenial but serious-minded atmosphere which at once pleases and inspires confidence. Instead of a bevy of cheap help, I see it manned by three excellent people: a pharmacist in the prescription department, the pharmacist-proprietor, and helping him in the front of the pharmacy an intelligent, personable woman whom we may refer to as a pharmacist's aide. These people are not clerks; they are technical people upon whose knowledge we can rely to help us in our buying. They receive each month salaries which compare favorably with those of other business and professional people in the town.

The $50,000 in sales they produce in a year permits, in fact, 17% or $8500 to be divided among them and provides a satisfactory dividend on the investment. Here we have the result of an improved selling policy backed up by an improved store plant. The selling policy makes higher caliber personnel necessary, and, because the efficiency of the selling plant makes *fewer* personnel necessary, it makes higher caliber personnel possible.

This, to me, is the pharmacy of tomorrow—the the pharmacy devoted to service selling. This is the pharmacy that already is being planned by the pioneers. The record it will make, broadcast to the world of retail pharmacy, should assure its duplication again and again in the many communities throughout the country. Thus we shall see the operation of a typically American process: men contributing their best to medical care, yet serving their own best interests and producing their own best public relations.



PENICILLIN MAY CAUSE DERMATITIS

Pronounced dermatitis of the eyelids due to use of penicillin eye drops for a case of conjunctivitis has been reported by Dr. Elias Selinger of Chicago (*J. Am. Med. Assoc.*, 128: 437, 1945). The patient appeared to have no history of allergic disturbances.

Another case of dermatitis of the same type had previously been observed by Keyes. At least two workers have reported penicillin dermatitis of other parts of the body which also involved the eyelids.

FREE BLOOD FOR CIVILIAN PATIENTS

Blood and blood fractions will be made available without cost to civilian physicians, hospitals, clinics and patients under a new program for recruiting blood donors, the American Red Cross has announced. The dramatic success of blood and its derivatives in war medicine led to establishment of the plan to assure supplies of the blood products to meet civilian needs. Chapters recruiting donors for the Army and Navy will not participate in the civilian program.

SUBMIT YOUR PROFESSIONAL PROBLEMS TO THIS JOURNAL, 2215 CONSTITUTION AVE., WASHINGTON 7, D. C., GIVING ALL PERTINENT DETAILS. SERVICE TO READERS IS PROVIDED BY THE A. PH. A. LIBRARY AND TECHNICAL STAFF AND THE FOLLOWING CONSULTING BOARD OF PHARMACEUTICAL SPECIALISTS:

MAISON DE NAVARRE
LOUIS FISCHER
LOUIS GERSHENFELD
MELVIN W. GREEN
ALBERT P. LAUVE
ADLEY B. NICHOLS
GEORGE C. SCHICKS
GEORGE L. WEBSTER
LEROY WEIDLE
ELMER H. WIRTH
LOUIS C. ZOPF

BENTONITE DIFFICULTIES

On several occasions I have had difficulty with prescriptions containing alcoholic liquids mixed with chalk mixture. An example is the following:

Tinct. Opii..... 5 ℥
Mistura Cretae, q. s. ad..... 8 ℥

Such mixtures result in a thick magma which I assume is due to the presence of bentonite.

Will you please advise me: (1) Has bentonite any medicinal value? (2) In addition to avoiding extemporaneous preparation what advantage has the U. S. P. XII formula over the U. S. P. XI formula? (3) In the above prescription I substituted Mistura Cretae U. S. P. XI. Is this permissible?—B. S., New Jersey

We have tried your prescription with chalk mixture U. S. P. XII, which contains bentonite, and have been unable to observe any thickening or change in the prescription after storage for one week. A mixture of this type should not cause any difficulty and the only answer to your query would seem to be that the bentonite was not thoroughly hydrated at the time the chalk mixture was prepared. We believe that if you will make a bentonite magma and completely hydrate it by letting it stand for several days, the prescriptions will be uniform in consistency. If the magma is made extemporaneously, it might help to use warm water and mix the magma for several minutes with a milk-shake mixer.

In answer to your several additional questions:

(1) Bentonite is used purely as a pharmaceutic necessity and not for any medicinal value.

(2) The U. S. P. XII formula for chalk mixture has several advantages over that of the U. S. P. XI. Sugar has been eliminated which decreases the possibility of fermentation and the replacement of acacia by bentonite also eliminated material which readily fermented. This was an important consideration because the preparation was used in treating cases where fermentation of one type or another was apparently involved.

(3) On this basis, therefore, we would not suggest that you substitute the U. S. P. XI mixture for that of the U. S. P. XII.

REFILLS FOR HIGH-POTENCY "D"

Can a prescription for vitamin D be refilled under the present law, or must a new prescription be written each time the vitamin is required?—M. D., New York

Your query no doubt refers to high potency dosages for therapeutic use, since there would be no question concerning refilling prescriptions for vitamin D to provide a regular dietary supplement.

It has been the opinion of the Food and Drug administration in regard to high potency vitamin D preparations that they cannot be used safely or efficaciously by the ordinary lay person, and that such products should therefore be dispensed only by or on the prescription of a physician. Refills should be made in good faith by the pharmacist. That is, there would seem to be no objection so long as the pharmacist has reason to believe that

the medication is being taken under the continued supervision of the physician. After two or three refills, it is suggested that the pharmacist either require a new prescription or telephone the physician to determine his wishes, thus assuring the administration of high potency vitamin D under medical direction.

"HAIR RESTORER" MEDICATION

Please furnish me with a "hair-restorer pomade," an oil-in-water type that contains lead acetate, 1.5% and precipitated sulfur, 3%.—T. K., Illinois

There is some danger involved in dispensing hair preparations containing a lead compound, except on a physician's recommendation, because of possible toxicity in the presence of a scalp abrasion. Moreover, in many states the dispensing of such products is specifically prohibited by law. It should also be borne in mind that there is no acceptable evidence to support claims that such preparations will "restore the hair." In view of these considerations we hesitate to recommend such a formulation.

ACIDITY TOO HIGH

I wish to submit the following prescriptions for your comment:

PRESCRIPTION NO. 1

Sod. phenobarbital	*grs.*	*16*
Elixir Betalin S, q. s. ad	*oz.*	*8*

PRESCRIPTION NO. 2

Phenobarbital	*grs.*	*16*
Elixir three bromides, q. s. ad	*oz.*	*4*

—D. D., Washington

PRESCRIPTION NO. 1: Elixir Betalin S is distinctly acid (*p*H 4.5) and will cause a precipitation of phenobarbital. If the acidity is reduced to the point where sodium phenobarbital remains in solution, the thiamine in the Elixir Betalin S will be rapidly destroyed. We would suggest that this prescription be abandoned and elixir of phenobarbital be prescribed alone with the thiamine hydrochloride administered either as tablets or as Elixir Betalin S.

The mixture can be kept in solution by substituting for a portion of the Elixir Betalin S sufficient alcohol to keep the phenobarbital in solution. Our tests indicate that about 10 cc. of alcohol per fluid ounce of mixture is required. This should not be done without discussing the change with the prescriber as it will reduce the dose of thiamine.

PRESCRIPTION NO. 2: The phenobarbital in this prescription should be changed to an equivalent quantity of sodium phenobarbital. Even when this is done, the elixir of three bromides will not dissolve the sodium phenobarbital because of the acidity due to ammonium bromide in the elixir. Our recommendation would be that you suggest to the prescriber that he change to elixir of sodium bromide, fortify it if necessary with additional sodium bromide and amaranth to color, and use sodium phenobarbital.

ENTERIC PENICILLIN CAPSULES

A paper in the Journal of the American Medical Association of May 12 contained information on the oral administration of penicillin, in which one of our physicians is interested. Could you give me information on how the capsule is treated with formaldehyde and alcohol to make it enteric?—H. A., California

The instructions given by Burke and his associates for preparing capsules for oral administration of penicillin were as follows:

"The contents of an ampul containing 100,000 units of penicillin were transferred to a gelatin capsule (No. 1) which was moistened and sealed and in turn placed in a second capsule of the next larger size (No. 0). It was then placed in a solution of formaldehyde U. S. P. diluted 1:20 for five seconds followed by immersion in 95% alcohol for five minutes. One hundred thousand units of sodium penicillin in the powdered form was adequately accommodated in a No. 1 capsule. Physical transfer of the penicillin involved the loss of a small quantity of the substance: the exact amount was not known, but probably represented about 5000 units."

SOLUBILITY OF SULFONAMIDES

Is it possible to make a 5% solution of any sulfonamide in 95% alcohol?—J. R., New York

Of the official sulfonamides two are sufficiently soluble in alcohol to permit the preparation of 5% solutions. The solubilities at 25° C. as given in the Pharmacopœia are as follows:

Sodium sulfapyridine, 1 Gm. in about 10 cc. of alcohol.

Sodium sulfathiazole, 1 Gm. in about 15 cc. of alcohol.

Other official compounds have the following solubilities in alcohol:

Sulfanilamide, 1 Gm. in about 37 cc. of alcohol.

Sulfapyridine, 1 Gm. in about 440 cc. of alcohol.

Sulfathiazole, 1 Gm. in about 200 cc. of alcohol.

Succinylsulfathiazole, sulfadiazine and sulfaguanadine, sparingly soluble.

Sodium sulfadiazine, slightly soluble.

SPRAY CLEANERS FOR WINDOWS

Do you have a formula available for a window spray cleaner? This is a rather unusual one but still you are mixed up with so many subjects that you may have an idea somewhere.—A. H., Maryland

Spray cleaners for glass usually consist of approximately a 5% aqueous solution of some organic solvent, which greatly reduces surface tension and is volatile. Bennett gives the following formulas:

I

Cellosolve acetate	1 pint
Sulfatate	10 grams
Water	19 pints

II

n-Butyl alcohol	1 pint
Sulfatate	10 grams
Water	19 pints

Cellosolve acetate is manufactured by Glyco Products Company, New York City; Sulfatate is supplied by Carbide and Carbon Chemical Corporation, New York City.

STERILIZING PROCAINE SOLUTIONS

In my duties as a pharmacist in the Army I came across the following problem:

Solutions of procaine hydrochloride are prepared for local anesthesia in minor surgery from procaine hydrochloride U. S. P. and sterile distilled water. I place the powder in a 50-cc. vial of sterile distilled water, recap, then autoclave it for 10–15 minutes.

When the solutions are sent to be autoclaved, they are perfectly colorless, but upon return the solutions are yellow. Have the solutions deteriorated?—L. G., New Jersey

Procaine solutions should not be subjected to temperatures above 100° C. Autoclaving such solutions in the routine manner will result in a change of color. The National Formulary directs that ampuls of procaine hydrochloride should be sterilized by Process D (moist heat at 100° C. for thirty minutes on three successive days). There are many manufacturers who use bacteriological filtration instead of heat and others who employ a temperature of not over 75 to 80° C. for several successive days (if heat is to be used). Even after sterilization, a change of color may result, especially if the solutions are exposed to light. Passing CO_2 into the solution also seems to preserve it for a longer period of time. It may be noted that the local anesthetic properties of colored solutions are not affected to any great extent as compared with those that are colorless.

CHOLINE CHLORIDE

I would appreciate any information you may be able to give me about choline chloride, which several medical officers are interested in using in the treatment of liver disorders. They are particularly interested in facts regarding dosage, tolerance and clinical statistics.—I. J. L., Missouri

Since the use of choline chloride for such conditions as fatty infiltration of the liver is still in the experimental stage, information on the subject is rather meager. A literature search for clinical trials reveals only the following:

Broun, G. O., and Meuther, R. O., *Journal of the American Medical Association*, 118: 1403, 1942. A note indicating somewhat favorable results. Average dosage used, 1 Gm. daily. The amino acid, methionine, appeared to have a similar action.

Yater, W. M., *Journal of the American Medical Association*, 121: 720, 1943. A negative note commenting on one of a series of papers on liver disorders in the March 6 issue.

Russakoff, A. H., and Blumberg, H., *Annals of Internal Medicine*, 21: 848, 1944. Used up to 6 Gm. daily with favorable results. Authors concluded that choline chloride as adjuvant to dietary therapy of cirrhosis, particularly of fatty alcoholic type, seemed justified. Other evidence apparently indicates that favorable response depends on administration in conjunction with a high vitamin and high protein diet.

It has been claimed that choline chloride is not particularly toxic. Specific data is available as follows:

Hodge, H. C., *Proceedings of the Society of Experimental Biology and Medicine*, 57: 26, 1944. Reports on toxicity when administered intraperitoneally. Additional references are included.

Bondi, A., and Myer, H., *Nature*, 154: 551, 1944. Discusses a case of choline poisoning in cattle which points to the possibility of toxicity when given over long periods of time.

Two recent papers on the pharmacology of this subject and the mechanism of fatty infiltration due to choline deficiency are as follows:

Stetten, D., Jr., and Salcedo, J., Jr., *Journal of Biological Chemistry*, 156: 27, 1944. Patterson, J. M., and McHenry, E. W., *Journal of Biological Chemistry*, 156: 265, 1944.

SODIUM FLUORIDE TOXICITY

Is a 2% solution of sodium fluoride used on the teeth to prevent decay safe? Since this chemical is also extensively used against roaches and other insects we would like to know something about the lethal dose, poisoning symptoms and mode of action. Are there effective antidotes?—C. B., Colorado.

Without knowing the manner in which a 2% solution is to be used on the teeth and by whom it is to be applied, it would not be possible to say that such a preparation would be safe. Sollmann, in his *Manual of Pharmacology*, states that a 2% solution kills the cells of mucous membranes and produces corrosion. Certainly the solution is stronger than preparations of this type that have been suggested in the literature and its application would not be without potential danger.

A recent investigation of caries control (*J. Am. Dent. Assoc.*, 31: 353, 1944) employed a sodium fluoride mouthwash made by dissolving 1 Gm. of sodium fluoride in 4 L. of water; saccharin and flavor were added to taste. One teaspoonful of this solution was used in a half glassful of water as a mouthwash.

To date the Food and Drug Administration has not granted new drug applications for sodium fluoride preparations of this type on the basis that their harmlessness under conditions of ordinary use has not yet been established.

The toxicity of sodium fluoride is of course very high. As little as one-fourth grain has caused nausea, and one grain or less will cause vomiting. Dangerous symptoms have been reported from the ingestion of 0.25 Gm. Death has been caused by 4 Gm. (Thienes). A case has been reported in which recovery followed the ingestion of 0.5 Gm. Chronic poisoning is caused by the regular ingestion of much smaller amounts.

Sodium fluoride is a general protoplasmic poison and locally produces necrosis of mucous membranes. It causes gastroenteritis and hepatic and other visceral degeneration with nutritional disturbances. Sollmann states that the acute effects may be due partly to disionization of calcium, but that other factors are probably more important, especially the destruction of various ferments. Muehlberger believed that the chief pathological changes were the congestion and hydropic degeneration of the liver and kidneys.

Lethal symptoms include muscular weakness and tremors progressing to clonic convulsions, fall of blood pressure, general collapse sometimes with grayish-blue cyanosis, and dyspnea followed by arrest of the respiration and of the heart.

In antidotal treatment of acute poisoning give at once calcium chloride or calcium lactate, 20 to 30 grains (*Recipe Book III*). If a soluble salt of calcium is not available, give milk or limewater freely, followed by an emetic or use of the stomach pump. The calcium salt should be repeated at intervals until recovery is complete. Soluble calcium salts may be given intravenously by the physician. The victim should be kept as quiet as possible.

EMULSION BECOMES TOO THICK

I recently prepared Cod Liver Oil Emulsion U. S. P., using Pharmagel A as the emulsifying agent. At room temperature the emulsion was excellent, but after refrigeration was too thick to pour. What do you advise in order to get a thinner preparation?—R. D., New York

We assume that the correct amount of Pharmagel A was used, which should be about 8 Gm. per 1000 cc. Before preparing the emulsion, a gelatin solution should be made and heated nearly to the boiling point for fifteen to twenty minutes to hydrolyze the gelatin and then cooled to about 50° C. It appears that this heat treatment was omitted, or insufficient heat used, in your procedure since unhydrolyzed gelatin will usually form an emulsion that has a tendency to thicken and jell somewhat upon standing. This would of course be pronounced if the emulsion were stored in a refrigerator.

MORE ABOUT ONION ODORS

In the August, 1944, issue you suggested that one or two parts of solution of formaldehyde, 40%, be used in a hand lotion to neutralize the odor of onions on housewives' hands. We have found this effective in removing the objectionable onion odor but the objectionable formaldehyde odor is said to linger for some time. Would a 2 or 3% solution of methenamine be just as effective? It has no objectionable odor.—D. K., New York.

We do not feel that methenamine can be recommended for this purpose because quite a few people are sensitive to it. If the lotion containing formaldehyde is sufficiently perfumed the formaldehyde odor will not be noticeable. The lotion might still be sufficiently effective if the formaldehyde content were lowered somewhat.

With A. Ph. A. Branches

WESTERN NEW YORK—At a dinner meeting in Buffalo's Touraine Hotel, the branch heard Jack W. Snowden of the Pictorial Paper Package Corp., Aurora, Ill., discuss development of the postwar pharmacy. Too many drugstores, he pointed out, lack the character to give them their proper appearance as the highest type of establishment on the street. The "health service center" type of operation was described as offering the greatest future opportunity.

A busy year at the University of Buffalo was reported by Dean Lemon of the School of Pharmacy, with registration of pharmacy freshmen exceeding all expectations.

A motion was carried that plans be formulated for joint meetings during the coming year between the A. PH. A. branch and the Western New York Retail Druggists Association.

ST. JOHN'S COLLEGE OF PHARMACY—Dr. Amalia J. Simonetti of Mary Immaculate and Lutheran Hospitals, specialist in the field of allergies, was the principal speaker at the student branch meeting called by President John H. McRedmond. Dr. Simonetti outlined the nature and etiology of these disorders, and discussed the symptoms of various foreign protein reactions with special emphasis on asthma. The lecture included a demonstration of intradermal tests for sensitization.

At the October meeting the student branch heard an address by Dr. Isaac Neuwirth, professor of pharmacology at New York University Dental College. Dr. Neuwirth emphasized the need for teaching prescription writing to dental students and outlined a classification of drugs used in dental practice.

In discussing dentrifices, he stressed the fact that acceptable products, as well as satisfactory prescription drugs, are evaluated and approved by the American Dental Association's Council on Dental Therapeutics.

INDIANAPOLIS COLLEGE OF PHARMACY—At the first meeting of the school year the following officers for the student branch were elected: Philip Summers, president; Harold Stark, vice-president; Thelma Murphy, secretary; and Walter Klink, treasurer.

PHILADELPHIA—At the October meeting members learned of the appointment of Dr. Joseph D. McIntyre, vice-president, as branch representative on the advisory committee to the Philadelphia Board of Health.

The principal speaker was Dr. Ernest Bergmann, graduate of the University of Berlin, who addressed the group on "The Synthetic and Biological Approach to Therapeutic Problems." He pointed out the close relationship between geometrical structure of a molecule and biological activity, illustrating this relationship with structural formulas of various medicinal agents.

Nineteen new members were elected to the local branch before the meeting adjourned.

NEW YORK—Eighty-five members and friends were on hand at the October meeting to hear two papers on vitamins: Dr. Norman Jolliffe, chief of the Nutrition Clinic of the N. Y. City Department of Health, discussed "The Preventive and Therapeutic Use of Vitamins," and I. H. Bander, general manager of McKesson and Robbins, spoke on "The Vital Elements of Vitamin Selling."

Selection of Dr. Joseph Rosin of Merck & Co. as the 1945 Remington Medalist was announced by Dr. H. H. Schaefer. President Lascoff then appointed Secretary Pokorny chairman of the Remington Medal Presentation Dinner, planned as a special session of the branch for December 11.

The "penicillin amendment" to the Sanitary Code of the N. Y. City Department of Health was discussed, which limits the dispensing of antibiotics and their preparations to prescriptions, excepting tyrothricin bandages or dressings. It was also announced that, as a feature of National Health Aid Week, station WINS would broadcast a dramatization of the life of the late Dr. J. Leon Lascoff of New York City.

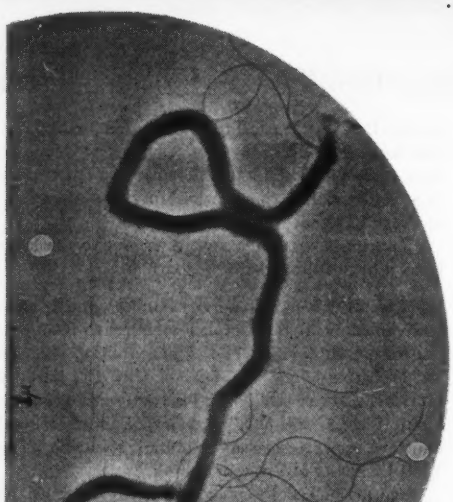
ARMY PHARMACIST CITED

Unusual pharmaceutical service constituting "meritorious achievement in connection with military operation against the enemy" has won the Bronze Star Medal for T/4 Alfred A. Reinhardt, an A. PH. A. member from Plainfield, N. J. His citation for service with the 375th Medical Battalion of the 75th Infantry Division stated:

"As a pharmacist in the Division Clearing Station, Technician Reinhardt compounded prescriptions without rest and subject to the strain of battle conditions. He volunteered to decipher German labels on captured stocks and studied foreign drug manuals to expedite the utilization of these stocks. Technician Reinhardt is to be commended for his diligence in converting captured supplies to our own use and for his meritorious service as a pharmacist. He has truly upheld the highest traditions of the Medical Department."

———R———

J. E. C. F. Harper and Company, retail pharmacy of Madison, Ind., is celebrating its centennial year of operation. Throughout the years the management has remained in the same family and is now headed by A. PH. A. member Merritt C. Harper.



ELECTRON MICROSCOPY

by
V. K. ZWORYKIN
and
J. HILLIER

AN AUTHORITATIVE EVALUATION OF NEW MICROSCOPE; MAGNIFICATIONS UP TO 100,000 EXTEND THE FIELD FOR RESEARCH WORK IN PHARMACY

ABOUT five years ago a few scientists of the world were provided with a new tool known as the electron microscope. Because of its unusual and somewhat spectacular nature, the advent of this new instrument into the practical side of science was heralded with much scientific and popular publicity. Since that time, an increasing but still relatively small group of workers have been slowly but surely establishing the electron microscope in its role as a high powered aid to our vision.

Much has been and probably will be written about the electron microscope, the interpretation of its images and its numerous applications. Generally speaking, however, a complete understanding of the electron microscope can be gained from the realization that it merely enables us *to observe through our sense of vision particles and structures in the size range 0.002 to 10 microns.* Thus, with this instrument we are able for the first time to observe visually the effects of research experiments on objects belonging to this size range.

In some cases spectacular results have already been achieved, though fundamentally this was because the visual information was all that was needed to *complete* the data on some particular material. Many other research problems attempted with the electron microscope have been disappointing at first because the other information available regarding the material under investigation was either incomplete or of the wrong type.

To the pharmacist the electron microscope presents the opportunity to study the physical form of pure chemicals and to correlate variations in physical form with variations in the properties of the product in its final application. It also provides, for the first time, a means for observing directly the effects of various chemical agents on small living cells—bacteria and viruses. Regarding accomplishments in this field, little can be said because only a few exploratory studies have been made.

To the interested bystander, it would appear that the electron microscope will be of great value to the pharmacist and pharmaceutical industries. However, a true evaluation of the electron microscope as a useful tool in this field cannot be made until a sufficient number of adequate tests have been carried out. In any case the final judgment will have to be made by the pharmaceutical scientist.

A little over fifteen years ago it was found that the path of electrons in electric and magnetic fields could be described in terms which are analytically equivalent to those of optics. By means of this electron optical equivalence it was shown that axially symmetric electric or magnetic fields had the properties of optical lenses, and, consequently, that it is possible to form electron images in the same way that light images can be formed.

At about the same time the discovery had been made that any material particle in motion had associated with it a characteristic wave length. For electrons (accelerated by 60 kilovolts) this wave length was found to be very small—around 0.05 Angstrom unit or only about $^1/_{100,000}$ that of

visible light. This meant that suitably designed electronic systems employing these high-speed electrons should be capable of extremely high resolving power.

These two concepts led directly and logically to the idea of an electron microscope based on principles similar to those used in an optical microscope, but in which the various components are replaced by their electron optical equivalent. Such an instrument employs condenser, objective, and projection lenses performing the same functions as the corresponding elements in the light microscope, but the lenses, instead of being made of glass, are formed by axially symmetric electric or magnetic fields.

During the past ten years, instruments of this type have been investigated in detail in various parts of the world. As a result, the electron microscope has been developed to a point where it is capable of a useful magnification nearly two orders of magnitude greater than the ordinary light microscope.

Until recently the development has been in the hands of physicists, and the instruments built were designed almost entirely for the purpose of studying the microscope itself. However, the electron microscope has progressed beyond this stage and has now become a research tool of great value. Ever-growing numbers of commercially built electron microscopes are being put into use in all types of research organizations, and already many important, and even some spectacular, results have been achieved. (See next page for illustration of modern electron microscope and diagram of construction described below).

The electrons used in the imaging process are supplied from the electron gun including a thermionic cathode which is maintained at 60 kilovolts negative with respect to ground and a final anode at ground potential. Between the two are disposed the electrodes required for controlling the electron paths.

BACTERIOPHAGE particles are shown (upper right) at a high magnification under the electron microscope, revealing their structure. E. coli organisms (center) have been attacked by the bacteriophage and five minutes after exposure some of the viruses can be seen attached to the bacteria (magnification about 15,000 times as shown). Thirty minutes after exposure to bacteriophage most of the cells have dissolved (bottom) with the production of a number of new virus particles.

THE SYPHILIS SPIROCHETE, treponema pallidum, is shown on the facing page magnified about 18,000 times.

The electrons leaving the gun have their full velocity, corresponding to 60 kilovolts.

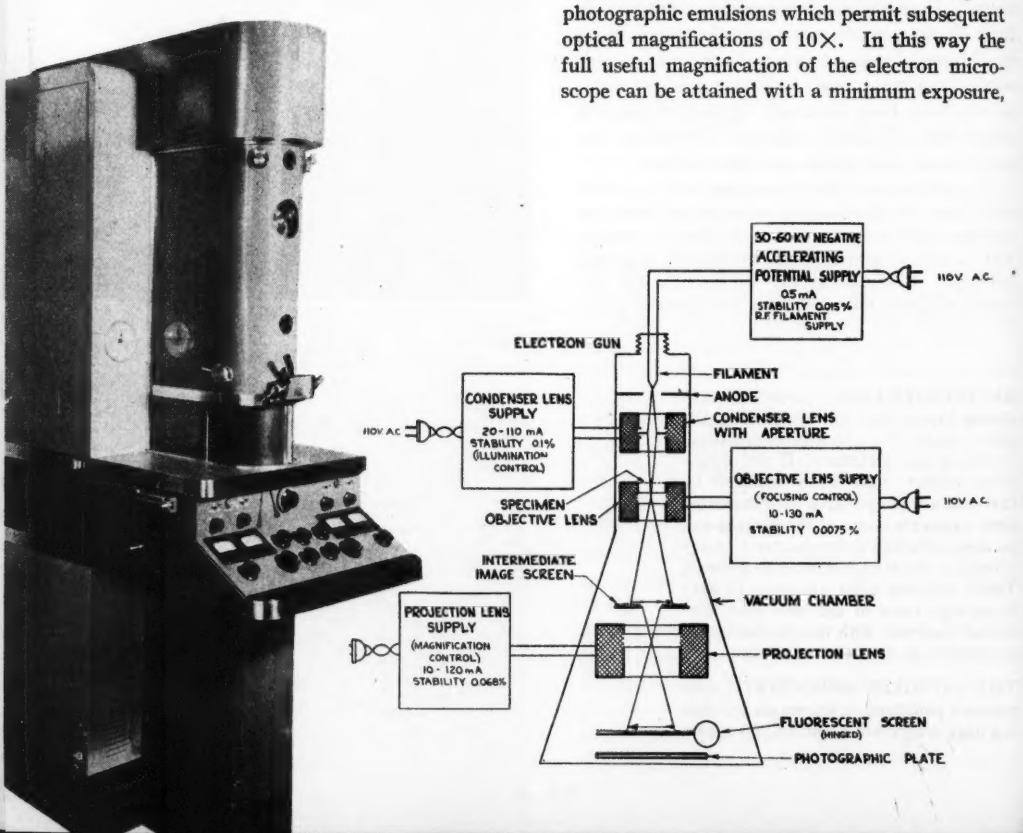
The condenser lens, which consists of an iron-clad coil with polepieces shaped to give the required magnetic field, causes the electrons to converge upon the specimen held a few centimeters below it. The condenser, like the condenser lens of a light microscope, can be used to control the angular aperture and hence the intensity of the illumination at the specimen.

After passing through the specimen, the electrons enter the objective lens. This lens deflects the electrons leaving the specimen in such a way as to focus them into a magnified intermediate image of the specimen. This image is formed directly above the projection lens. The objective, like the condenser, is an iron-clad coil, but the polepieces are, of course, different in design to meet the requirements of this element.

The final image is formed from that portion of the intermediate image which passes through the projection lens and is reimaged in the plane of the observing screen or photographic plate. The observing screen is coated with a fluorescent material producing a visible image by means of which the operator can focus the instrument and can adjust the specimen to obtain an appropriate field of view. The fluorescent screen is hinged so that it serves as a shutter to the photographic chamber immediately below it. The photographic record is made by allowing the electronic image to fall directly on the sensitive emulsion of the photographic plate.

The magnification of the objective lens is usually around 100×, though by changing the position of the specimen and the strength of the lens it can be adjusted to lie anywhere between 50× and 100×. The magnification produced by the projection lens can be varied from 20× to 300× so that the total magnification of the instrument can be controlled over the range 100× to 30,000×. By properly modifying the polepieces of the objective and projection lenses, the instrumental magnification can be varied from as low as 200× to as high as 100,000×.

However, as mentioned earlier, the magnification used has little significance as a measure of performance of the instrument. This type of electron microscope is capable of a resolving power of as low as 2 millimicrons, which corresponds to a maximum useful magnification of around 100,000. In practice, however, it is found that *instrumental* magnifications of this magnitude are both unnecessary and undesirable. Instead, magnifications of the order of 10,000× are used, and the images are recorded on fine grain photographic emulsions which permit subsequent optical magnifications of 10×. In this way the full useful magnification of the electron microscope can be attained with a minimum exposure,



minimum requirements of the power supplies, and maximum field of view.

Electrons will not travel freely through air; hence the entire electron optical path of the microscope must be under vacuum at pressure of about 0.0001 mm. Hg. The microscope chamber is exhausted through a large manifold by a fast oil diffusion pump backed by a mechanical forepump.

Interpretation of Images

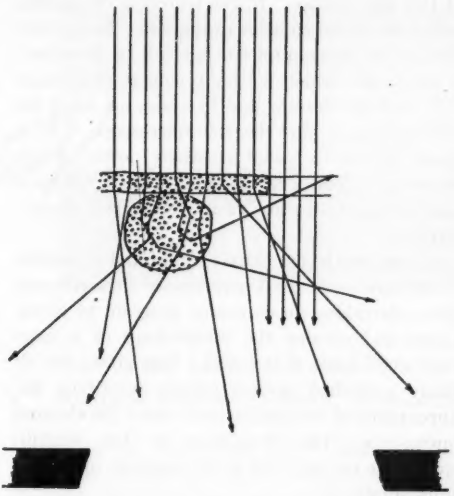
It is the variations in intensity over the image plane that constitute an image and reveal the geometrical structure of the object; that is, the sizes of particles and structures, their shapes and their organization in larger structures.

In an electron microscope the intensity of any point of the image will depend on the number of electrons which left the corresponding point of the object in a direction enabling them to pass through the objective. This will, in turn, depend on the scattering power and hence the mass density of the specimen point.

This is illustrated above where the cross section of the specimen has been greatly enlarged and some of the probable electron paths have been drawn in. It can be clearly seen how areas of greater thickness or greater density increase the scattering power of the object and hence decrease the intensity of the corresponding image points.

At first sight it would appear that the conditions of formation of an electron microscope image are much simpler than those encountered in light microscopy where the image is a result of a number of complex phenomena. Actually, however, since the scattering phenomena on which the formation of an electron microscope image depends are only accurately understood for special cases lying at both extremes of those encountered in practice and since the aberrations of the electron lenses (also only inadequately investigated at present) and crystallinity of the specimen introduce serious intensity anomalies, the correlation between the properties of the specimen and the intensity of the image is extremely involved and ambiguous.

In the final analysis it appears that the information provided by the electron microscope is identical with some, though not all, of the information provided through our ordinary sense of vision. Thus, in using this new instrument it must always be remembered that it is not possible to make an interpretation which goes beyond the directly measurable factors of size, shape and structure except through the accumulation of additional information either by auxiliary experimentation or by experience.



SCATTERING OF ELECTRONS by the specimen and the selective action of the objective lens aperture are illustrated in the diagram.

Applications

The number of problems to which the electron microscope has been applied in the few years of its existence is literally astounding. In the field of biology they run the entire gamut from the larger anatomical structures of insects through diatoms, cell structures and bacteria to viruses and large organic molecules.

In the field of chemical particles it has been used to examine all types of finely divided materials from extremely thin evaporated films through fine colloidal particles and pigment to the larger chemical particles and crystals. With the development of the replica technique the study of the surfaces of materials of all types has also become one of the major applications of the electron microscope.

A large part of this work has naturally been of an exploratory type, and many of the results have been incidental to the initial "feeling out" of the possibilities of the instrument. This phase of the application of the electron microscope is now passing, and many investigations of fundamental importance are being undertaken.

In a brief general review of the subject of electron microscopy it is not possible to present a complete survey of the research accomplishments

of this new science. In the following discussion, only a few representative examples of the application of the electron microscope will be described.

Organisms which normally consist of a single cell, such as diatoms and bacteria, are ideal for observation in the electron microscope. As a result of the increased resolving power of the electron microscope, various types of bacteria can be seen to possess easily recognized characteristics.

Consequently Dr. Stuart Mudd and a number of co-workers at the University of Pennsylvania are undertaking an extensive program to investigate and catalog the morphology of a large number of types of bacteria. This group has already published several papers describing the appearance of various bacteria under the electron microscope. The illustration of the syphilis spirochete on page 384 is an example of the results obtained.

Useful to Pharmacy

Of special interest to the pharmacist is the possibility of observing directly the effects on bacteria of various chemicals and drugs. At present only a few exploratory experiments have been carried out though the results are striking enough to justify an intensive study of this particular aspect of bacteriology.

The extremely minute viruses which cause a number of common diseases in plants and animals have been known for a number of years. More recently some of these viruses have been obtained in a relatively pure form and many of their properties determined. Before the advent of the electron microscope this work was analogous to "flying blind over unknown territory." In spite of this apparent handicap many exact measurements were made and later when the viruses were observed for the first time in the electron microscope, these measurements were found to be extremely accurate.

An outstanding example of the application of the electron microscope to the virus problem, and one in which the results obtained surpassed anything possible by indirect methods, is found in the study of bacteriophage.

It was known that the bacteriophage particle was a type of virus which could destroy (lyse) the bacteria for which it is specific. Nothing, however, was known regarding the mechanism of the destruction. By applying the electron microscope to the problem, Luria, Delbruck and Anderson were able to produce a series of micrographs which not only made the bacteriophage particle visible for the first time but also showed that it had a well-coordinated structure in spite of its minute size and showed very clearly part of the method by which the bacteriophage reproduced itself through the destruction of its host.

Action of Bacteriophage

Such a sequence of micrographs is shown on page 385. It can be seen how one or more bacteriophage particles become attached to and perhaps enter a host cell. After an interval of some fifteen to twenty minutes the host bacterium appears to disintegrate and a large number of newly formed bacteriophage particles, along with other material, are expelled.

Of all applications of the electron microscope, that in the field of chemistry is probably the most direct and of the greatest immediate importance. It is concerned almost exclusively with the correlation between the size, shape and structure of finely divided particles and the physical and chemical properties of the bulk product. The particles studied range in size from as large as several microns down to molecular dimensions. This range includes almost every material that occurs in a particulate form.

By means of the electron microscope, particle size distributions can be determined to within 5×10^{-6} mm. Measurements obtained in this way have the further advantage that the shape of particles is visible.

It is in the application of the electron microscope to industrial chemistry that the electron diffraction adapter is of most use as an auxiliary means of obtaining information. Transmission-type electron diffraction patterns of finely divided crystalline materials are very readily obtained and give an accurate check on the composition of the material being examined.

In the preceding paragraphs an extremely sketchy review has been given of the new science of electron microscopy in which a few examples of applications of interest to pharmacists have been included. While it has not been possible, in this limited space, to discuss any of these applications in detail,* the utility of the electron microscope in any particular problem can be judged by the reader himself if he considers the instrument simply as a means of extending our vision.

---

* For a comprehensive listing of the papers on the electron microscope and its application the reader is referred to the excellent bibliographies compiled by C. Marton and S. Sass and published in the *Journal of Applied Physics*, **14**, 522 (1943) and **15**, 575 (1944).

The Hospital Pharmacist

EDITORIAL

by LEO F. GODLEY

AMERICAN SOCIETY OF HOSPITAL PHARMACISTS

PHARMACY service to a hospital is a twenty-four hour responsibility. The hospital staff that has to struggle through the emergencies of the night and week end without pharmaceutical service from the pharmacist is not enjoying the full benefits that we, as a specialized pharmaceutical and therapeutic entity, should offer.

Pharmacies that desire to give their institutions the full value of their services have met this situation in various ways with the cooperation of the nursing and medical staffs. Many departments have found that they can meet the needs of the institution by maintaining an "on call" system whereby a pharmacist is available without actually being in the pharmacy.

In hospitals where pharmacy interns are trained, the interns are required to live in the hospital dormitories. This proximity serves to make a pharmacist immediately available, and in turn serves as a teaching method by virtue of the fact that it attaches importance and responsibility to the intern's position. This, added to the experience gained through meeting emergencies, is invaluable in the training of a hospital pharmacist.

Some hospitals have found that an extra pharmacist added to the staff for night duty was advisable, while others have removed a pharmacist from the regular daytime staff and delegated to him certain duties that can be done at night such as manufacturing and bookkeeping, thus easing the daytime load. This last method might be applicable to most hospitals that do not carry an intern training program provided the daytime staff is ample. In some cases it might be more agreeable with the staff to rotate this night "shift."

In any case it is desirable to permit only emergency calls after the regular day hours. Otherwise night service might soon become as extensive as during the day. Nursing staffs often have been accused of procrastination in keeping the floor drug inventory satisfactorily up to date. When this becomes the practice, real emergencies do arise frequently. Practically every hospital pharmacist has been awakened after midnight to fill an order that the physician left in the afternoon or even on his morning rounds. This, emphatically, is not the evening service that the pharmacy should offer.

In institutions where a pharmacist is not always in the pharmacy, an emergency drug supply should be made available to the night supervisor of nursing. A small quantity of the several drugs that might be urgently needed, in addition to those stocked on the floors, are packaged and kept in a designated locked cupboard or box. When an ampul, a box of tablets, or a bottle of liquid is removed, a requisition is left which the pharmacist finds the following morning and the used drugs are replaced.

If the emergency cupboard does not offer a solution to the emergency, then the pharmacist is called. These calls should always come from the nursing supervisor or the physician. Some pharmacists have found that taking night calls for medication only from the physician has helped to rule out unnecessary interruptions.

Most pharmacists have found the practice of leaving the pharmacy key in the nursing office entirely unsatisfactory. It is disconcerting to see strange tracks left in the pharmacy by a searching party of bewildered nurses. It is definitely a dangerous practice with the existing similarity of drug terms and synonyms. Records show that serious mishaps have resulted from this similarity in the hands of one not experienced with the tricks of nomenclature.

Our aim in bringing this idea to hospital pharmacists is not to implore the installation of a neon

"open all night" over the pharmacy door. Instead, it is hoped that pharmacists who are not entirely satisfied with their present system will realize that the problem is a very real and common one, and that other pharmacists have found means to control it.

These pharmacists are anxious to help you; no doubt you can help them with something else no less important. Correspondence and interchange of information with other hospital pharmacists are among the benefits of organization

N. CAROLINA OFFERS VETERANS COURSE IN HOSPITAL PHARMACY

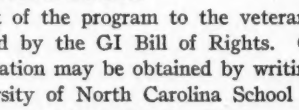
A course in hospital pharmacy for returned veterans has been established at the University of North Carolina School of Pharmacy and four leading hospitals. A twelve-month period of practical training in the hospitals is now available and a four-week classroom course will be given at the School whenever a sufficient number of veterans is enrolled.

Cost of the program to the veteran will be covered by the GI Bill of Rights. Complete information may be obtained by writing to the University of North Carolina School of Pharmacy or the North Carolina Pharmaceutical Association, Chapel Hill, N. C.

MASSACHUSETTS GROUP MEETS

Meeting at Cambridge Hospital, the Massachusetts Society of Hospital Pharmacists heard a special address by Dr. Louis K. Diamond of the Harvard Medical School, who spoke on "Therapeutic Use of Blood and Blood Substitutes." Later the members viewed a motion picture on "Research and Control."

With Carl A. MacDonald, founder and chairman of the organization now in the armed forces, John Murphy of Massachusetts General Hospital has assumed the chair.



J. B. SPROWLS, JR., JOINS BUFFALO FACULTY

Dr. J. B. Sprowls, Jr., formerly of the Colorado University School of Pharmacy, has been appointed head of the Pharmacy Department at the University of Buffalo College of Pharmacy.

Typical Days

From the Secretary's Diary for October

—1ST—

IN THE heavy morning mail a number of communications that warmed the heart. One of these from J. G. Ballew, actively engaged in the practice of pharmacy for 53 years, and still operating in the establishment where he gained his apprenticeship, carrying on, as he says: "in the same establishment, but in a different manner," also just re-appointed to the North Carolina Board of Pharmacy, to which he was originally named in 1926.

—2ND—

The day's routine interrupted with a visit to the Veteran Druggists' luncheon in company with Dr. Powers. It is a pleasure to dine with such men as Kebler, Taylor and the other Washington veterans whose total service in the various phases of pharmacy exceeds 1000 years. In the late afternoon a visit from R. D. Hetterick, general sales manager of William R. Warner and Company, who explained in detail the new professional fee plan, just announced, and it seems to us that Warner has hit on something.

—3RD—

A visit from Bob Hardt, E. R. Squibb's vice-president, and a quick trip to the National Museum where splendid progress is being made on the installation of the Squibb Ancient Pharmacy. This will indeed be a show place in behalf of the profession, when the artists at work on this project under Dr. Whitebread, pharmacy curator, are finished.

To lunch at the Mayflower with Bob Hardt and J. S. Mordell, erstwhile WPB associate and now a member of the surplus property staff of the U. S. Public Health Service. Late at the office with Paul Nowell, our efficient financial aide, to work on the budget.

—4TH—

Early in the morning to Baltimore for the annual meeting of the Maryland Pharmaceutical Association which we addressed on "Where Shall We Practice Pharmacy?" Later to listen to Dr. R. P. Herwick explaining the new regulations with respect to the prescription legend, and then to the annual dinner at which Swain presided with stories that gave the professional humorist who spoke later a close run for his money.

—5TH—

Busy with the staff getting out letters to state pharmaceutical association secretaries, and collecting data for the coming joint meetings of the N. A. R. D.-A. PH. A. executive bodies.

—8TH—

The usual heavy Monday routine interspersed

with a luncheon with Joseph P. Burt at the Watergate Inn to discuss WPB problems, of which there are still a few, mostly on penicillin and quinidine. In the late afternoon and far into the night sweated blood to finish an article in behalf of hospital pharmacists.

—9TH—

On the early morning train to New York with various appointments scheduled, including a pleasant visit with G. A. Pfeiffer, R. D. Hetterick and E. F. Fauser. To dinner with George Archambault who has done a magnificent job for the U. S. Public Health Service in the pharmacy at Boston but is itching to return to academic duties and other activities.

How I wish the government and pharmaceutical organizations requiring the best brains in our field could compete financially with other interests so as to give us a fair share of the talent which is available.

—10TH—

To the Pharmaceutical Advertising Club for a luncheon talk on the topic "To Whom Is Pharmaceutical Advertising Addressed?" in which we asked some pertinent and perhaps impertinent questions. Anyway, we tried to make the point that pharmaceutical advertising should talk up to a group of professional men, and not down to petty merchandisers. Also, we asked whether advertising copy is written to please the man who okays the copy or to educate the final representative of every producer, namely, the retail distributor.

Later a ride on the ferry to Staten Island with Archambault and a pleasant meeting with Dr. Tucker, the commanding officer of the U. S. Marine Hospital, and his pharmacy staff. Inspection of this hospital pharmacy was a part of our U. S. Public Health Service survey activity. By automobile to Elizabeth, N. J., and then on the 7:33 to Washington, arriving late at night.

—11TH—

And now a busy day preparing for the Barbiturate Conference to be held tomorrow. Among the early evening arrivals for tomorrow's conference were Hugo Schaefer, R. L. Swain and Leslie Jayne, and we had some profitable discussions of many subjects at dinner and late at night.

—12TH—

As related on page 356 of this issue of the JOURNAL, the Barbiturate Conference proceeded according to plan. No participant who had promised to be there was absent. Here was a group of earnest men who recognize pharmacy's responsibility, as well as the responsibility of other professions, on a question which has great social implications as well as medical and pharmaceutical aspects, and hardly a phase of the question escaped discussion.

The stenographic transcript will present an unusual record of experience and clear thinking on this subject. The AMERICAN PHARMACEUTICAL ASSOCIATION has a real job on its hands in translating the contributions of the participants into a workable program.

—15TH—

To the Senate Office Building for hearings on the research foundation bills and greatly entertained by the recital of reasons for government participation by Vannevar Bush, who made out an excellent case, although disagreeing with experts from General Electric, General Motors and other industrial organizations in some respects. And it seems that the great difference of opinion is on whether government research should be directed by one man with an advisory committee, or by a committee with an executive director subject to committee direction. All of which adds up to the fact that you cannot legislate executive ability or personality into existence either in committees or individuals.

A pleasant half hour with A. N. Richards, head of the Medical Service of the Office of Scientific Research and Development, who chanced to dine alone at the Willard about the time we had the same idea.

—16TH—

Following the morning routine a series of afternoon conferences including discussions of the proposed survey of pharmacy and pharmaceutical education with Drs. Zook and Brumbaugh of the American Council on Education, and an interesting talk with Gen. Paul R. Hawley, newly appointed Acting Surgeon-General of the Veterans' Bureau.

If everybody had the same idea about pharmacy that these men have, we would have little difficulty in establishing our claims to more adequate consideration. The reorganization of the medical services under Gen. Hawley will undoubtedly produce a more satisfactory medical setup with pharmacy included. At 6:20 bound for Harrisburg via P.R.R., arriving after 9 p. m., for a preliminary meeting with members of the Pennsylvania Board of Pharmacy.

—17TH—

All day with the Pennsylvania Board of Pharmacy discussing problems of great interest to the pharmacists of that state, and found Secretary Wilbur Goodyear the same faithful worker in behalf of Keystone State pharmacists he was in the days of our presidency of that State Association some twenty-five years ago. Now re-enforced with men like Mark Rothman of Philadelphia, presiding officer of the Board, and James A. Mosteller, Edwin S. Rowse and Fred D. Costenbader, this Board is really ready to go places. Late in the afternoon by rail to Washington, arriving about 9 o'clock, with still a little time to catch up on the accumulated correspondence of the day.

—18TH—

Today came Dr. F. R. Moulton, permanent secretary of the American Association for the Advancement of Science, to discuss problems of mutual interest.

The afternoon taken up largely by a meeting of the Library Committee, conferences with representatives of the pharmaceutical press, and a visit with

Richard Deno, now back at Rutgers and his National Formulary work. His interest in the historical shrines fostered by A. PH. A. has not abated and we shall continue to have his help in their management. To dinner at the Roger Smith Hotel with J. S. Mordell and then back to the office for an evening of toil with the accumulated mail.

—19TH—

A busy day preparing for the Proceedings Issue of the *Scientific Edition* of the JOURNAL which we will get out in December, and also preparing for the collection of the annual dues which are due January 1; and finally reviewing budgets with staff members, preparatory to their submission to the Finance Committee.

—22ND—

To the hearings before the combined Senate Committee on Military Affairs and Commerce on the establishment of a national research foundation. Took part in a four-man panel which included Dr. Morris Fishbein of A. M. A., Dr. E. M. MacEwen of the American Association of Medical Colleges and Dr. Allan Butler of Massachusetts General Hospital. All agreed that there should be government participation in medical research, but that government should act in the nature of a coordinating agency, and not replace individual initiative as fostered by educational institutions, foundations and industry.

In the afternoon brief visits with some members of the Contact Committee of the American Drug Manufacturers' Association and American Pharmaceutical Manufacturers' Association who were in session for two days at the Washington Hotel. To dinner with George Beal at the Willard and then a conference on many A. PH. A. Council matters which have been in abeyance.

—23RD—

Considerable agitation over a circular issued by the U. S. Civil Service Commission calling for pharmacists to come into the government service, but setting the requirements so low that top-notch pharmacists will not be interested. Told representatives of the Commission it is a mistake to recruit pharmacists for public service on a basis of education below that now required for licensure in 45 states and asked pharmaceutical associations to contact their Congressman and others to hammer some sense into representatives of the Commission who are selling pharmacy short.

In the afternoon a visit from George Beal to go over additional A. PH. A. business, and then a staff meeting at which all had the pleasure of Dr. Beal's presence and advice. Later a conference with Dr. Hazleton, chairman of the Scientific Section, who feels that his group is not satisfied with the present procedure of handling papers submitted.

In the evening to help celebrate the golden wedding anniversary of A. C. Taylor and Mrs. Taylor at their home, and it was a joy to see the outpouring of friends who came to wish this fine couple well. Late that night an unexpected call from George Beal who had departed early in the evening to the airport for a flight to Pittsburgh, but was grounded because of bad weather at Pittsburgh. We were glad to be able to share our room with him for Washington's hotels were jammed.

—25TH—

The day's routine pleasantly interrupted at luncheon with Dr. H. Van Zile Hyde of the U. S. Public Health Service now assigned to the State Department and working on the international health setup which will take form under the United Nations charter. He had many an interesting tale of his experiences in the Middle East, from whence he returned but recently.

—26TH—

Many a long-distance call this morning, including one from Philadelphia to consummate final arrangements for entertaining the winners of the Pharmacy Week student display prize at Temple University, which will consist of a visit to A. PH. A. headquarters during Pharmacy Week. Also long-distance conversation with Terry of Chicago and O'Brien of Albany regarding future visits to these cities.

To lunch at the Watergate Inn with A. C. C. Hill, vice-chairman of the WPB, who is in charge of the Office of Civilian Requirements. Our building and extent of our activities surprised "Cliff" as they have surprised many others, who have wondered what that little white building on Constitution Avenue houses.

REASONS WHY

Yes, there are many reasons why you should place your fire insurance with the druggists' own Company.

Ask any druggist who has had a fire—he knows some of the reasons.

Ask our agent—ask us—there are many reasons why—all for your benefit.

THE AMERICAN DRUGGISTS' FIRE INSURANCE COMPANY

CINCINNATI 2 OHIO

And today our Highway Research Board friends of the National Research Council, who have been occupying space with us during the emergency, moved back to their main headquarters at the Academy of Science next door. While we are glad to get the space which this group occupied, we shall miss the friendly contact with those fine people.

—27TH—

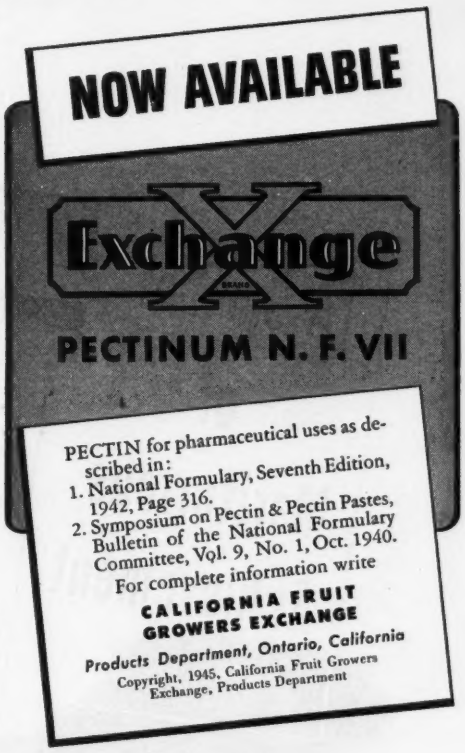
And now for the train to spend a week end at the new home in Red Bank, N. J., to which we have removed from Trenton, after months of searching for a suitable place in the city of Washington, with no success. Hereafter the secretary's home address will be Blossom Cove Road, P. O. Box 150, Red Bank, N. J., but ASSOCIATION mail will, of course, be received at 2215 Constitution Ave., N. W., Washington 7, D. C. At Red Bank on the Shrewsbury River there will be relaxation over the week end, if, as and when, and we hope to continue to vote in the Garden State although it will be in Monmouth County and not in Mercer where the ballot has been cast for the past nineteen years.

—29TH—

A lengthy conference at National Selective Service Headquarters on the pharmacy student situation, and found some possibility of pharmacy student deferment if a case equal to that of medical and dental requirements can be made. Glad to welcome Russell Rothrock of Evansville, Ind., for twenty-four years a member of the Indiana Board of Pharmacy and now its secretary, together with his son who has become a prominent radio engineer with offices in Washington. Russell still has an optimistic outlook on the future of pharmacy which is a good omen in such high places in Indiana pharmacy.

D. C. WILL BAN DISHWASHING BEHIND FOUNTAINS

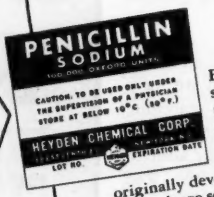
The District of Columbia Health Department has announced plans to require that dishwashing in public eating places be conducted only in properly equipped kitchens. A spokesman indicated that the ruling is aimed primarily at those drugstores in the food business which do not have proper facilities for washing and sterilizing dishes and silver.


NOW AVAILABLE
Exchange
PECTINUM N. F. VII
PECTIN for pharmaceutical uses as described in:
1. National Formulary, Seventh Edition, 1942, Page 316.
2. Symposium on Pectin & Pectin Pastes, Bulletin of the National Formulary Committee, Vol. 9, No. 1, Oct. 1940.
For complete information write
CALIFORNIA FRUIT GROWERS EXCHANGE
Products Department, Ontario, California
Copyright, 1945, California Fruit Growers Exchange, Products Department

Here's One Time
The Most Popular Brand
is also
THE EASIEST TO OBTAIN
The brand that's 1st with the nation's pharmacists
ASK YOUR WHOLESALER
MAGNUS, MABEE & REYNARD, INC.
16 DESBROSSES ST. NEW YORK, N. Y.
221 N. LA SALLE ST. CHICAGO, ILL.

PHARMACY *as a Career for the Returning War Veteran*
offers opportunities, following a sound educational foundation received at this institution. Modern buildings and equipment, thorough courses, competent faculty. B.Sc. degrees in Pharmacy, and in Chemistry, Bacteriology and Biology. Graduate studies leading to M.Sc. and D.Sc. degrees.
Write for Catalog.
Philadelphia
COLLEGE OF PHARMACY AND SCIENCE
Founded in 1821 43rd Street, Kingsessing and Woodland Aves., Philadelphia 4, Pa.

A Symbol of Meritorious Achievement



For years the Heyden label has been a symbol of meritorious achievement in the preparation and refinement of complex organic chemicals. It has distinguished an important and growing list of medicinals — including many originally developed in the Heyden laboratories.

The large scale production of Penicillin is a recent Heyden accomplishment and Penicillin Calcium Heyden and Penicillin Sodium Heyden, outstanding for their quality, are serving widely and well on the international health front.

Produced and controlled by highly skilled personnel, Penicillin Calcium Heyden and Penicillin Sodium Heyden meet the exacting requirements of the Heyden laboratories and of the Penicillin regulations promulgated by the U.S. Food and Drug Administration.

Heyden's elaborate research facilities, supplemented by research fellowships at leading universities, are a part of its program to maintain the enviable position of scientific attainment which is synonymous with "Heyden."

Penicillin Calcium Heyden and Penicillin Sodium Heyden are supplied to pharmaceutical manufacturers who market them under their own labels.

For research and compounding, Penicillin Calcium Heyden and Penicillin Sodium Heyden, in both vials and bulk, are sold directly to the user by Heyden.

HEYDEN *Chemical Corporation*

393 SEVENTH AVENUE, NEW YORK 1, N. Y.